Research Trends In Cardiovascular Medicine and Heart Failure

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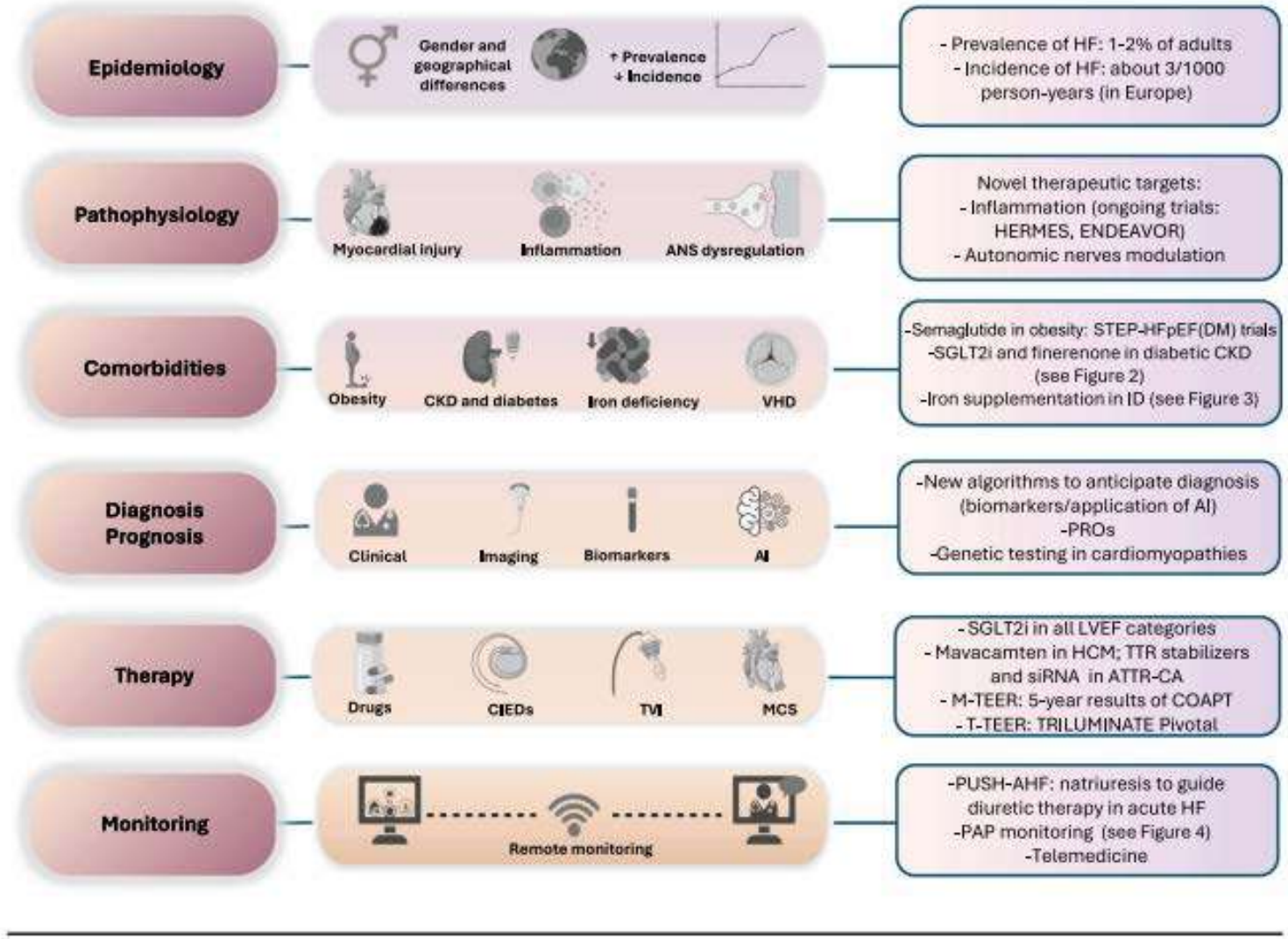
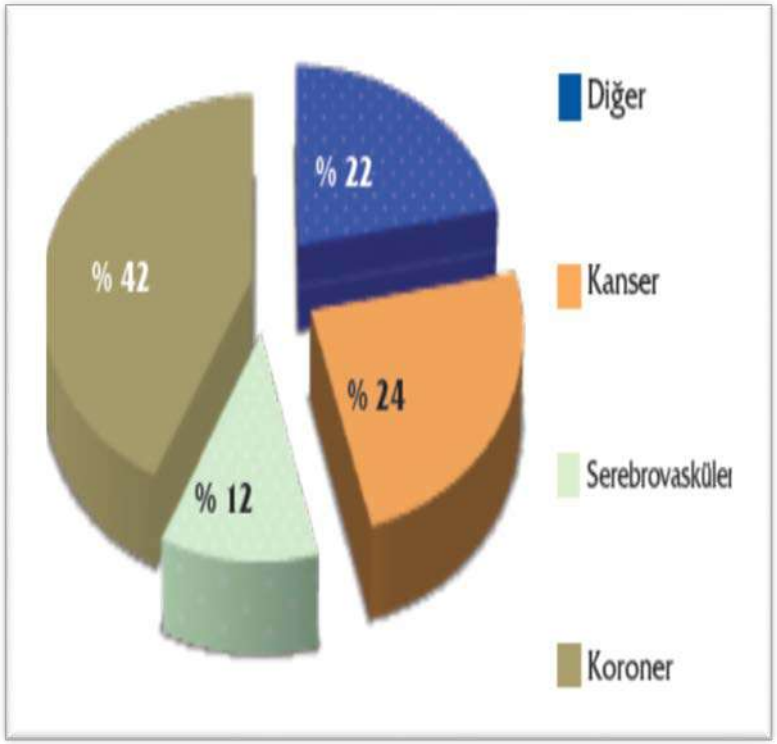
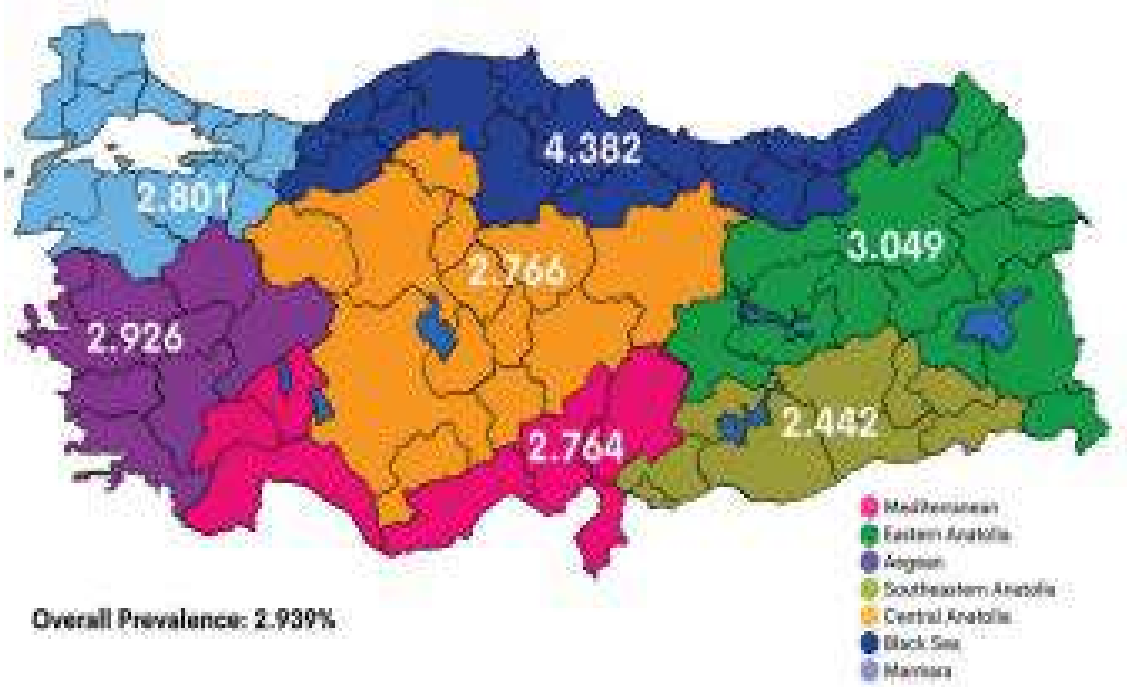


Beghini, Alberto, et al. "2024 update in heart failure." *ESC Heart Failure*

Epidemiology

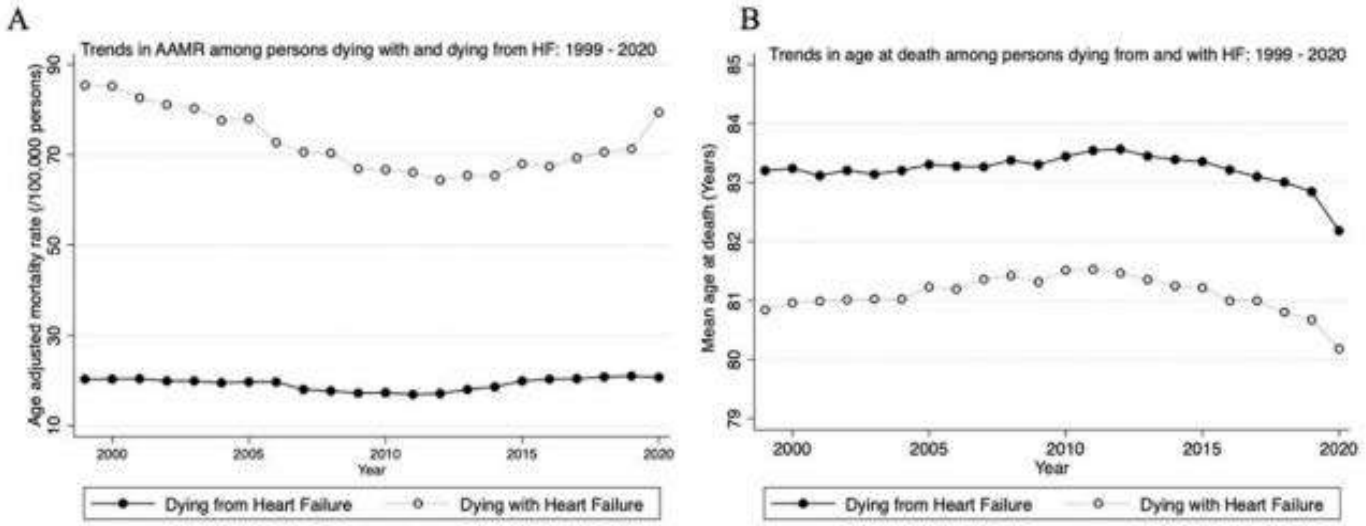


Epidemiology



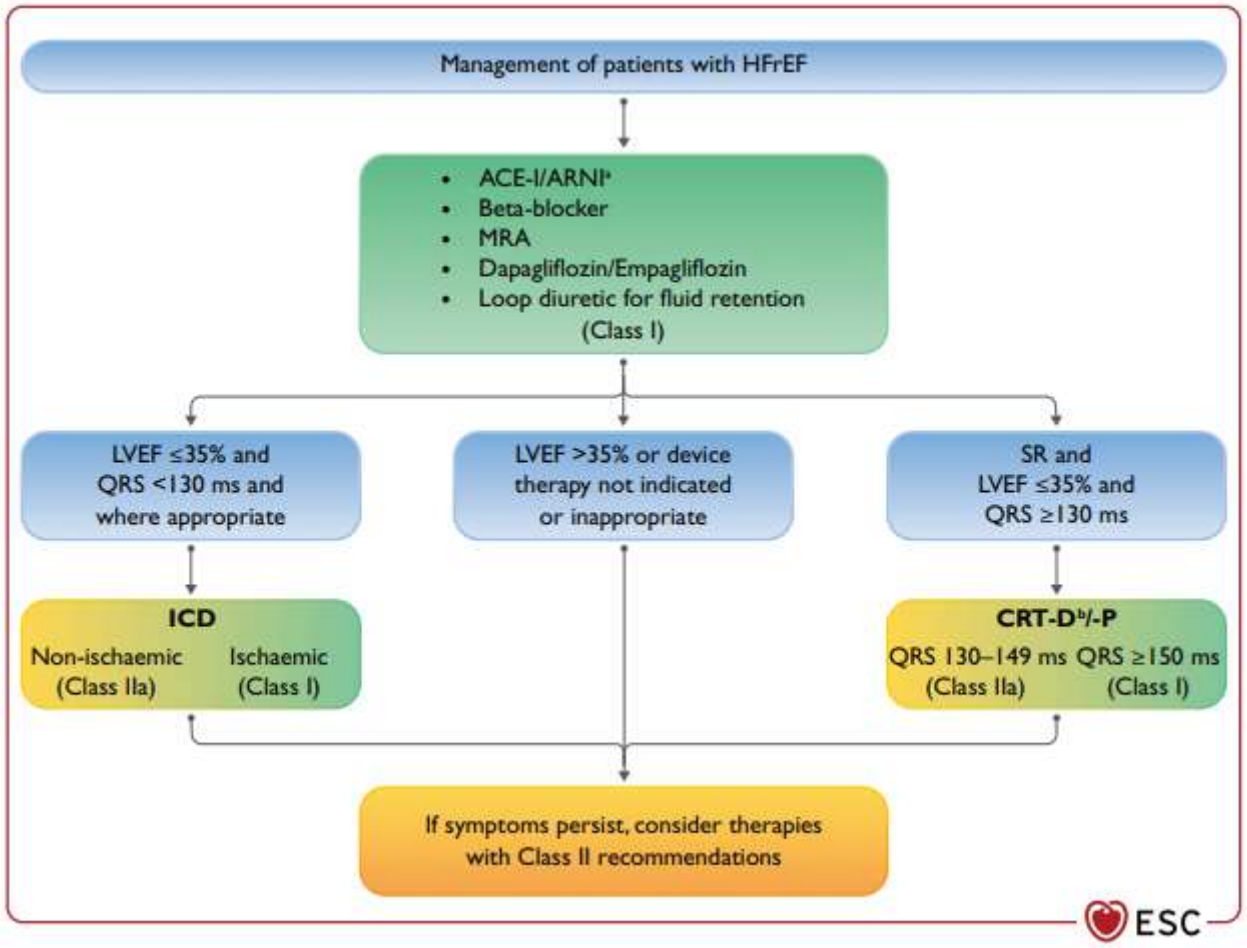
Regional Disparities in Heart Failure Epidemiology and Outcomes: A Comprehensive Study Across Geographical Regions in Türkiye. Balkan Med J. 2024 Jan 3;41(1):47-53

Epidemiology

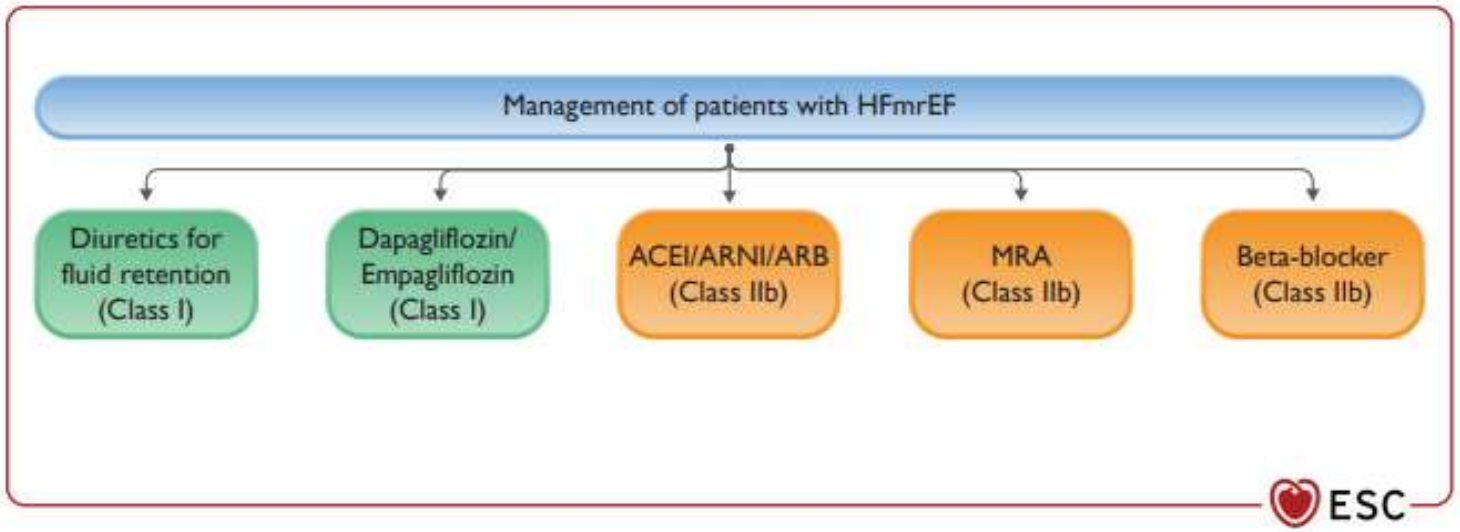


Trends in heart failure mortality in the USA 1999 to 2020, European Heart Journal, Volume 44, Issue Supplement_2, November 2023

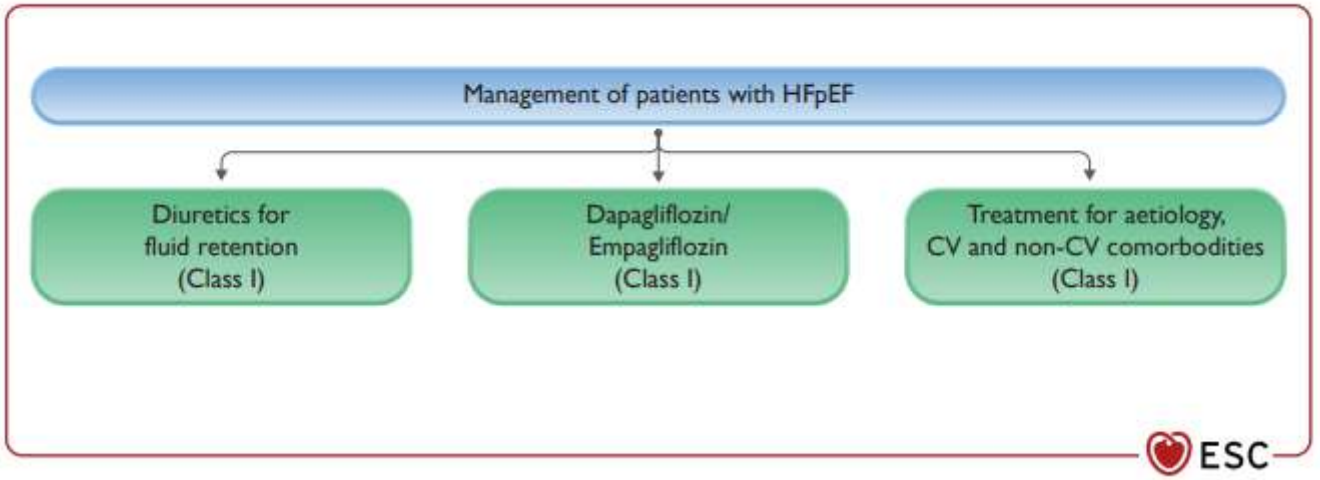
HFrEF Treatment-ESC 2021



HFmEF Treatment-ESC 2023



HFpEF Treatment-ESC 2023



Comorbidities Treatment

- Obesity
- Iron deficiency
- Renal Disease
- Diabetes Mellitus
- VHD

STEP-HF$_p$EF

Semaglutide in Patients with Heart Failure with Preserved Ejection Fraction and Obesity

Study population

HFpEF patients

- left ventricular ejection fraction ≥45%
- body mass index ≥30 kg/m2
- HF symptoms
- functional limitations (New York Heart Association functional class II–IV and Kansas City Cardiomyopathy Questionnaire Clinical Summary Score [KCCQ-CSS] <90 points)

Where?

13 countries in Asia, Europe, North America and South America

96 sites

Who and what?

529 patients

randomised 1:1

once-weekly for 52 weeks

semaglutide 2.4 mg

placebo

Primary endpoints

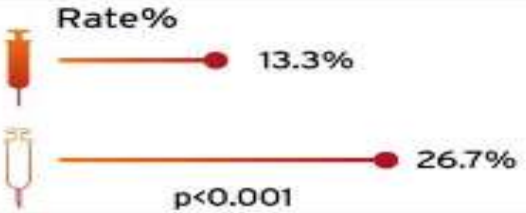
change from baseline to week 52 in KCCQ-CSS

estimated treatment difference 7.8 points
95% CI 4.8 to 10.9
p<0.001

change from baseline to week 52 in body weight

estimated treatment difference -10.7%
95% CI -11.9% to -9.4%
p<0.001

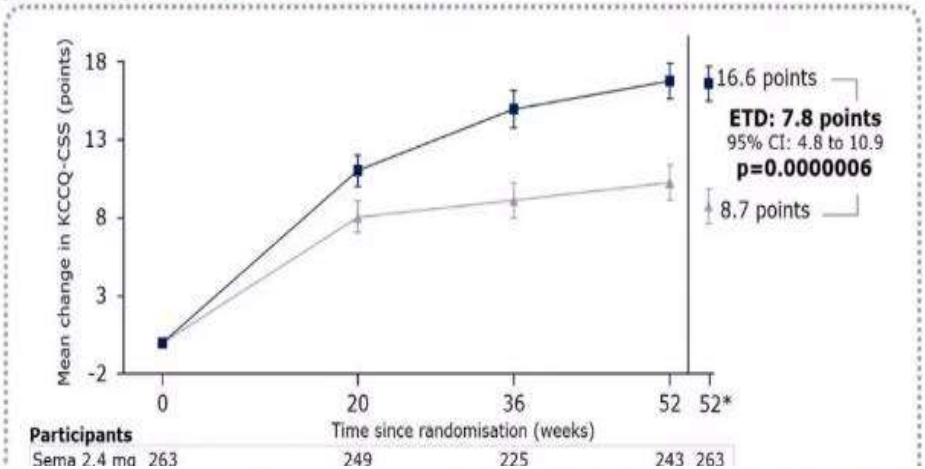
Serious adverse events



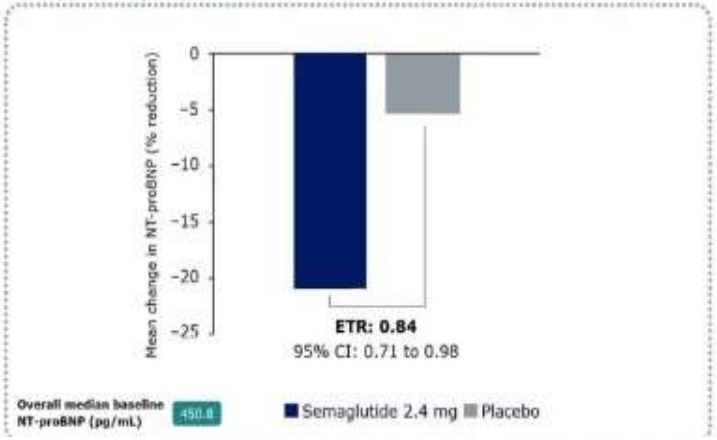
p<0.001

STEP-HF$_p$EF

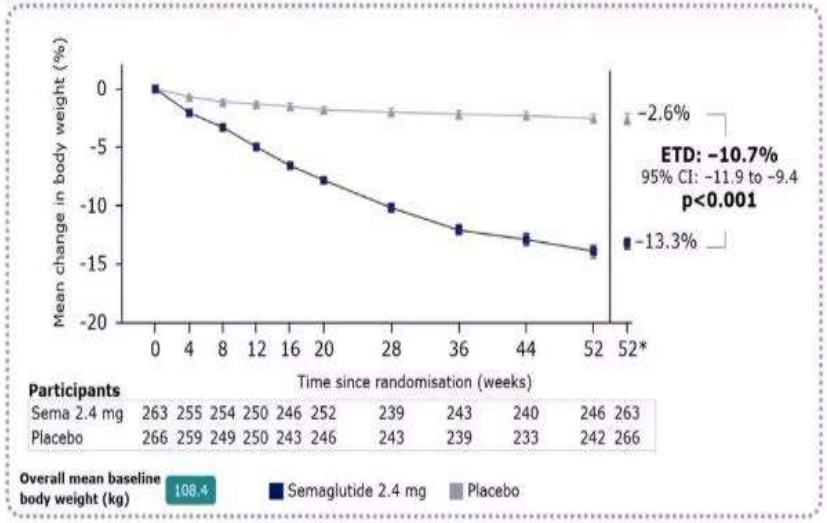
Change from baseline to week 52 in KCCQ-CSS
Dual primary endpoints



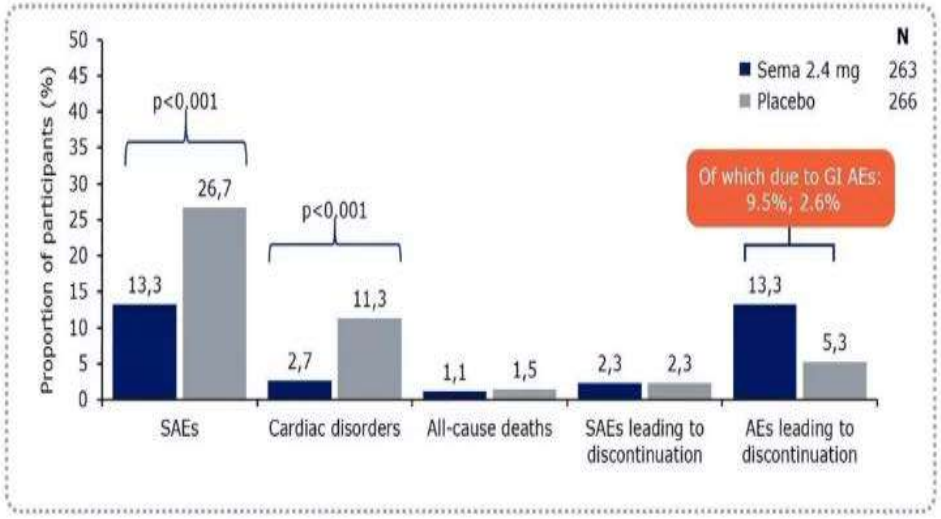
Change from baseline to week 52 in NT-proBNP
Exploratory endpoints



Change from baseline to week 52 in body weight
Dual primary endpoints



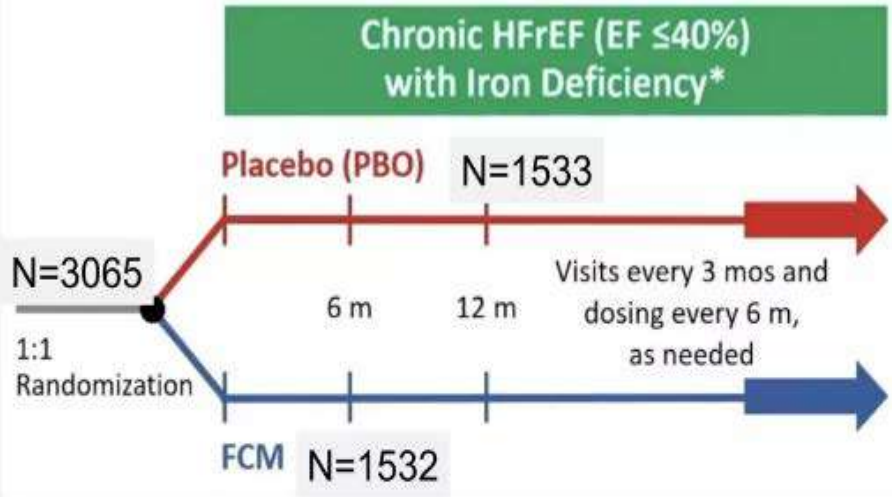
Safety overview
On-treatment period



Semaglutide

- Among patients with obesity-related HFpEF and T2DM, semaglutide led to larger reductions in HF-related symptoms and physical limitations and greater weight loss than placebo at 1 year

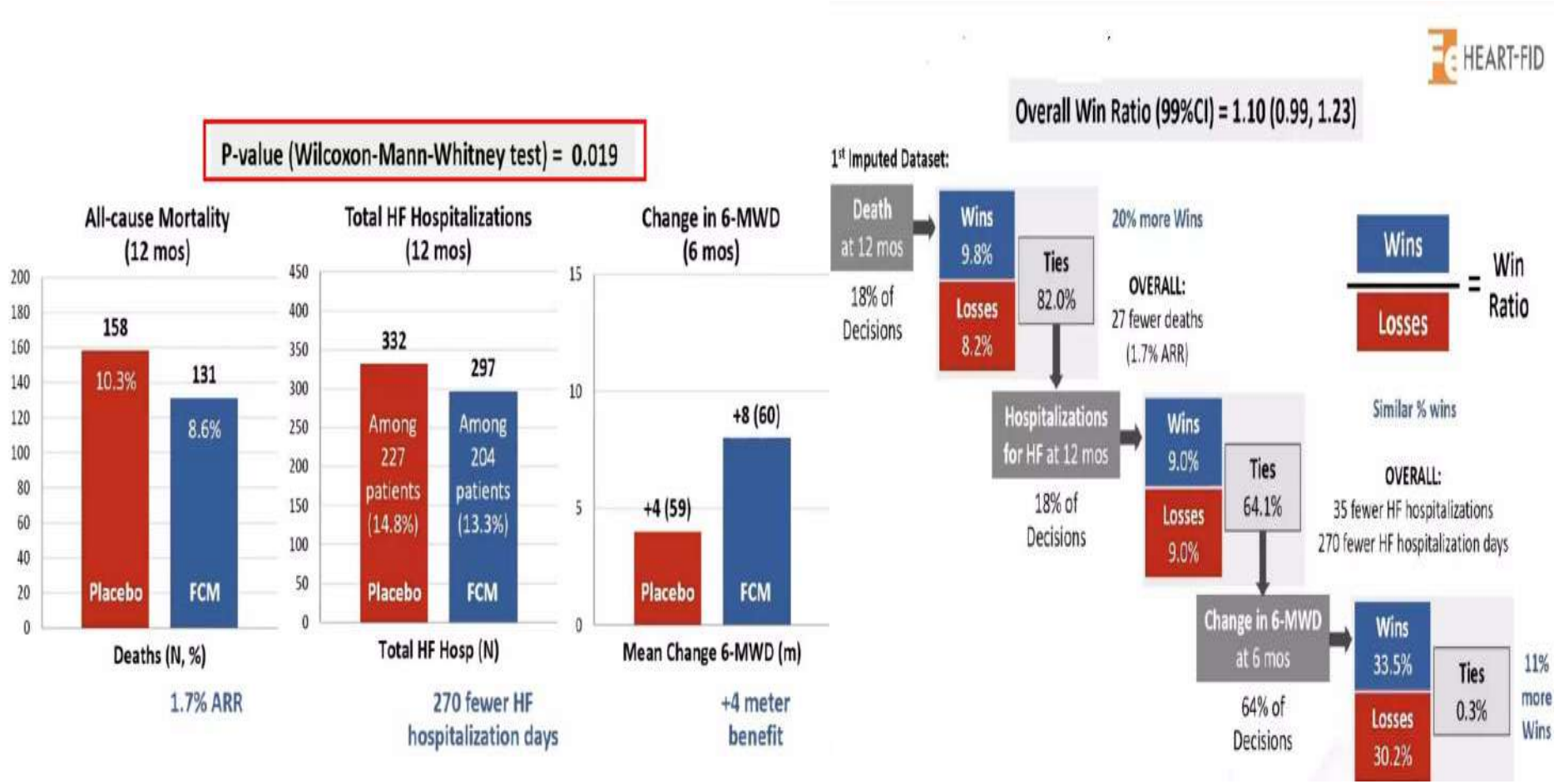
HEART-FID: Ferric Carboxymaltose in Heart Failure with Iron Deficiency



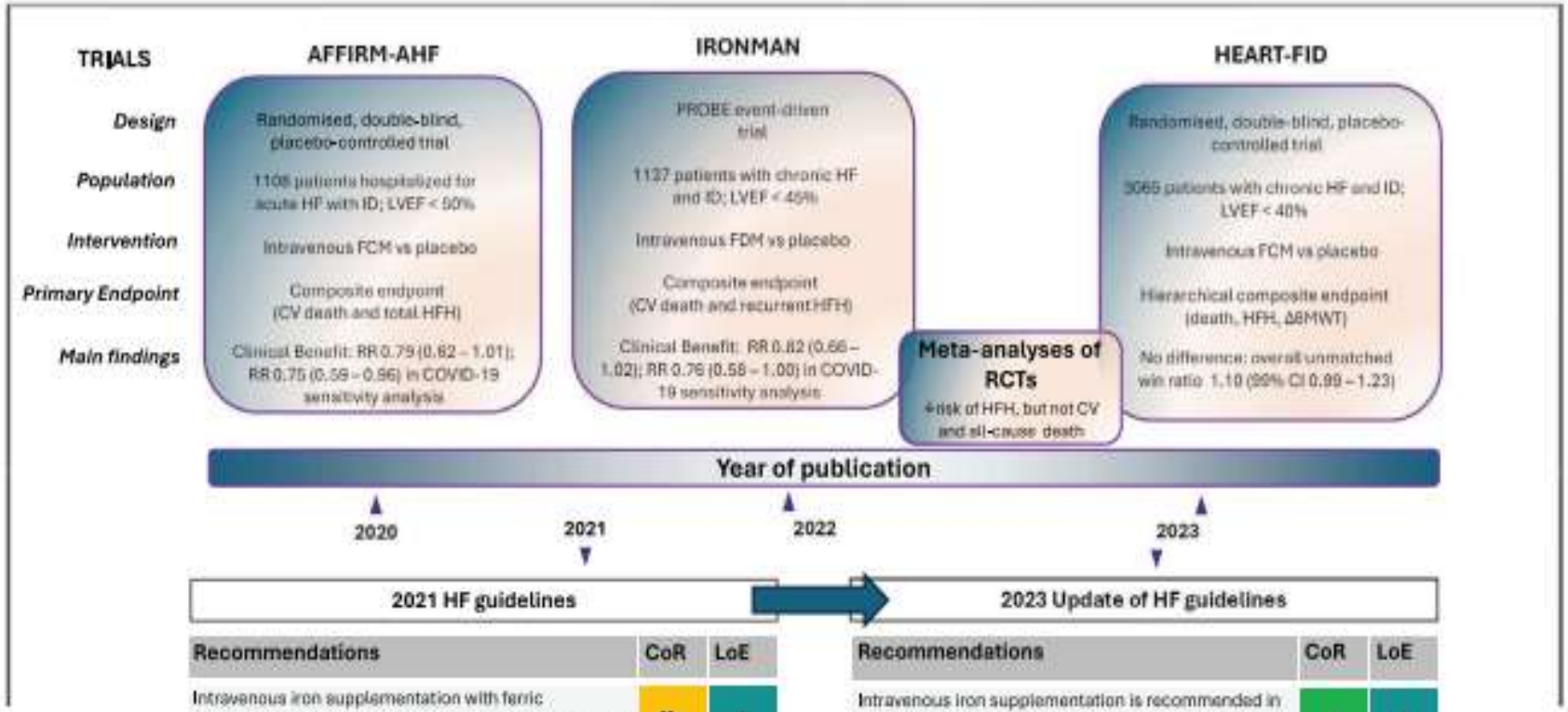
FCM Dosing (every 6 m based on labs†)	
<50 kg	≥50kg
Two doses of **15 mg/kg** separated by 7 days	Two doses of **750 mg** separated by 7 days

†Once iron replete, transition to placebo; blinding maintained

HEART-FID

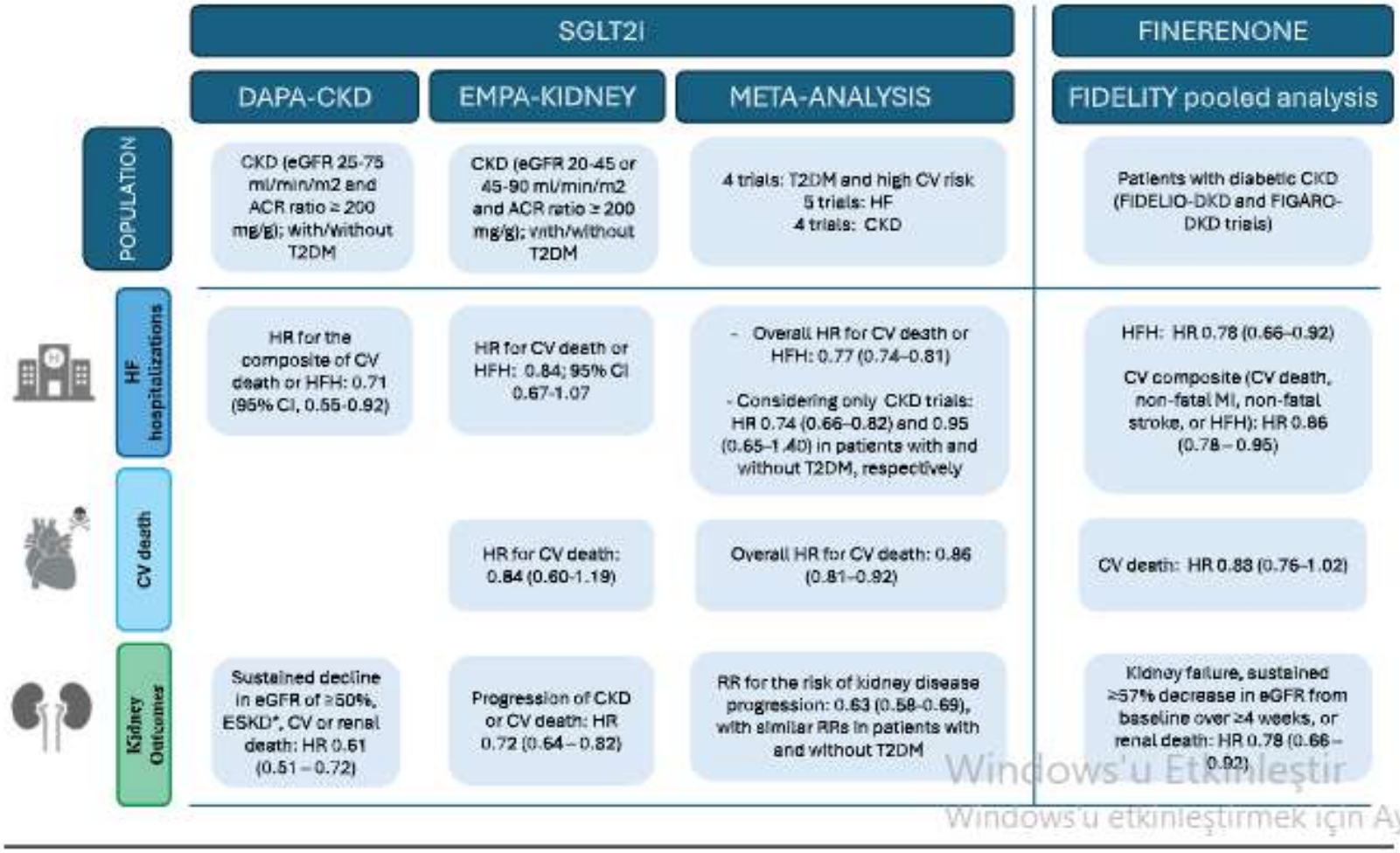

P-value (Wilcoxon-Mann-Whitney test) = 0.019
All-cause Mortality (12 mos)
158
10.3%
131
8.6%
Placebo
FCM
Deaths (N, %)
1.7% ARR
Total HF Hospitalizations (12 mos)
332
Among 227 patients (14.8%)
297
Among 204 patients (13.3%)
Placebo
FCM
Total HF Hosp (N)
270 fewer HF hospitalization days
Change in 6-MWD (6 mos)
+4 (59)
+8 (60)
Placebo
FCM
Mean Change 6-MWD (m)
+4 meter benefit
HEART-FID
Overall Win Ratio (99%CI) = 1.10 (0.99, 1.23)
1st Imputed Dataset:
Death at 12 mos
18% of Decisions
Wins 9.8%
Losses 8.2%
Ties 82.0%
20% more Wins
OVERALL:
27 fewer deaths
(1.7% ARR)
Hospitalizations for HF at 12 mos
18% of Decisions
Wins 9.0%
Losses 9.0%
Ties 64.1%
Similar % wins
OVERALL:
35 fewer HF hospitalizations
270 fewer HF hospitalization days
Change in 6-MWD at 6 mos
64% of Decisions
Wins 33.5%
Losses 30.2%
Ties 0.3%
11% more Wins
Wins / Losses = Win Ratio

Iron Deficiency of HF



Beghini, Alberto, et al. "2024 update in heart failure." *ESC Heart Failure*

CKD and DM

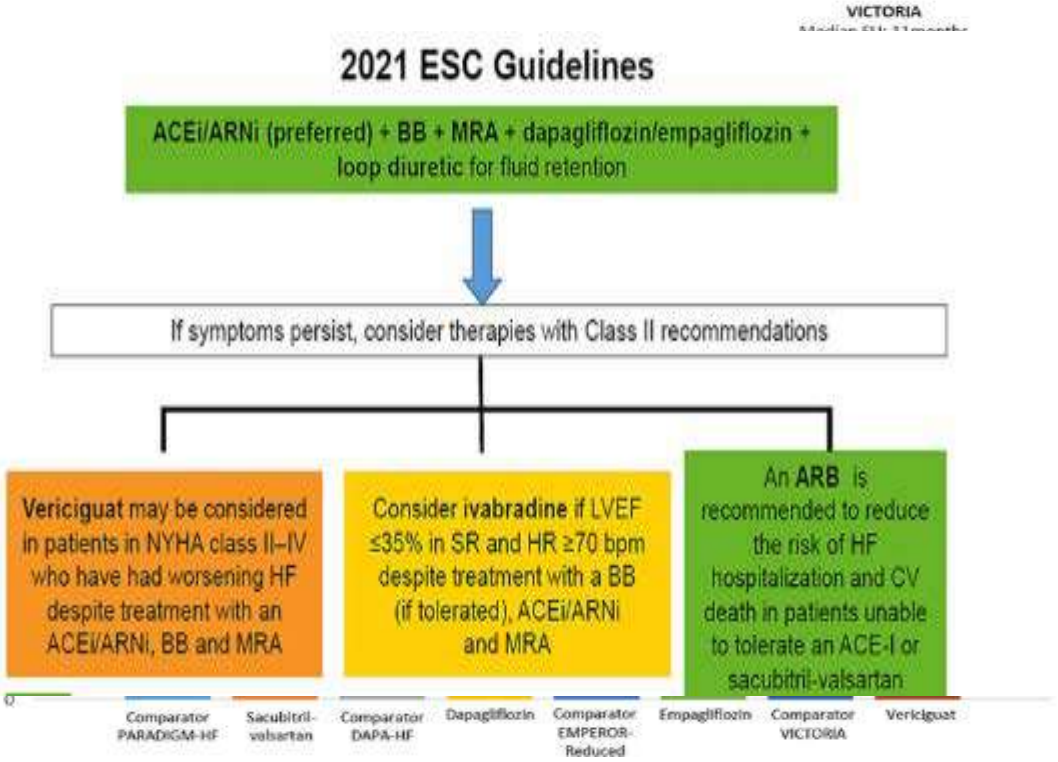


CKD and DM

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] SGLT2 inhibitors (dapagliflozin or empagliflozin) are recommended to reduce the risk of HF hospitalization or CV death.[5,7,35]	I	A
In patients with T2DM and CKD,[c] finerenone is recommended to reduce the risk of HF hospitalization.[10,11,34,40]	I	A

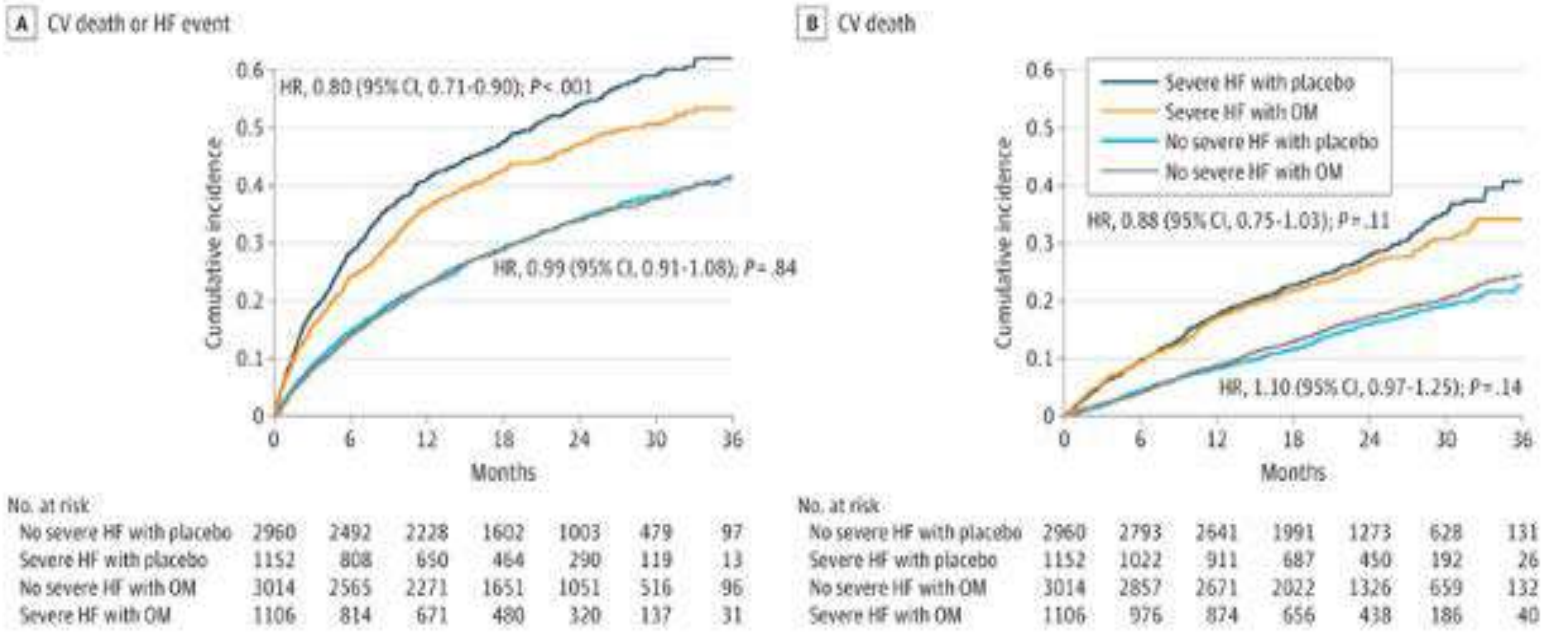
Soluble guanylate cyclase stimulators



ESC Heart Failure 2024; 11: 628–636

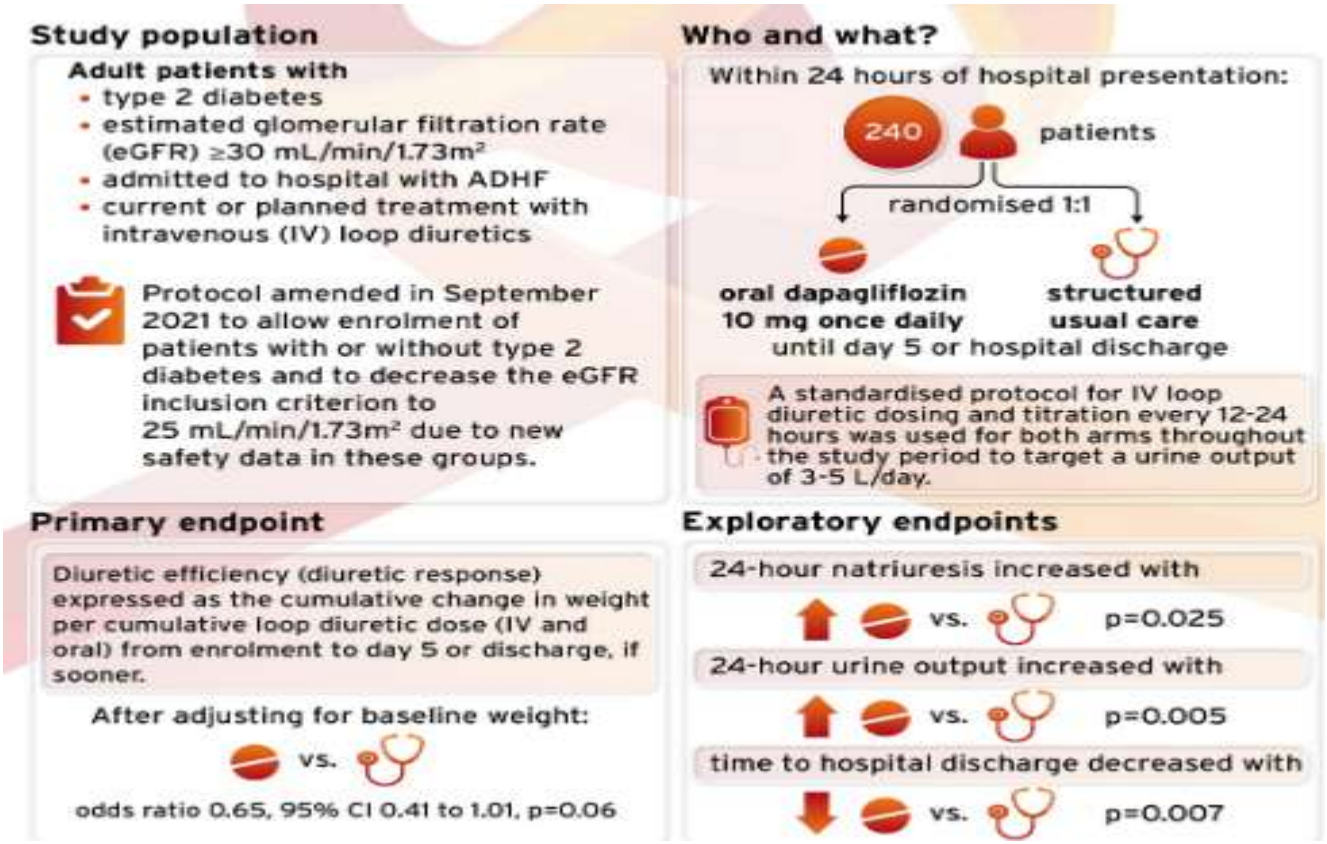
Myosin Activators

- Selective cardiac myosin activator omecamtiv mecarbil
- GALACTIC-HF Trial



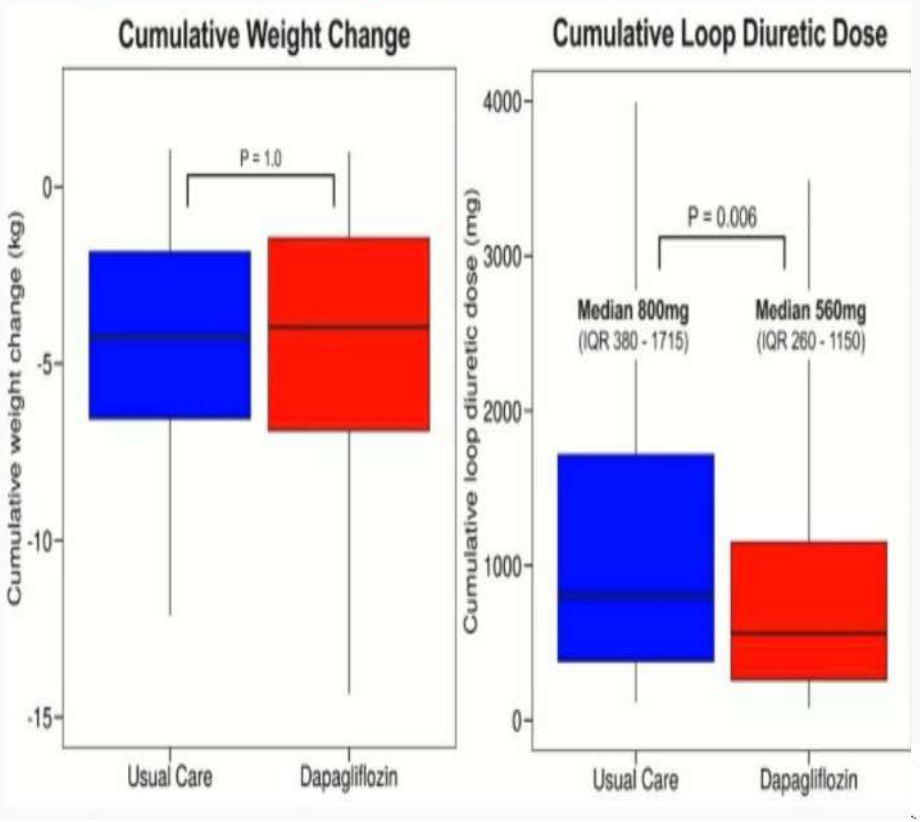
Acute Heart Failure

DICTATE-AHF: Early Dapagliflozin Iniciation in Acute Heart Failure

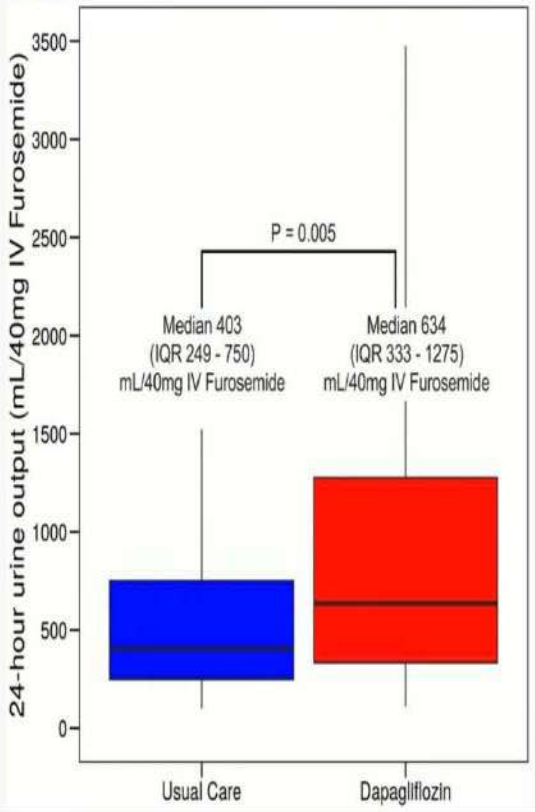


DICTATE-AHF: Early Dapagliflozin Iniciation in Acute Heart Failure

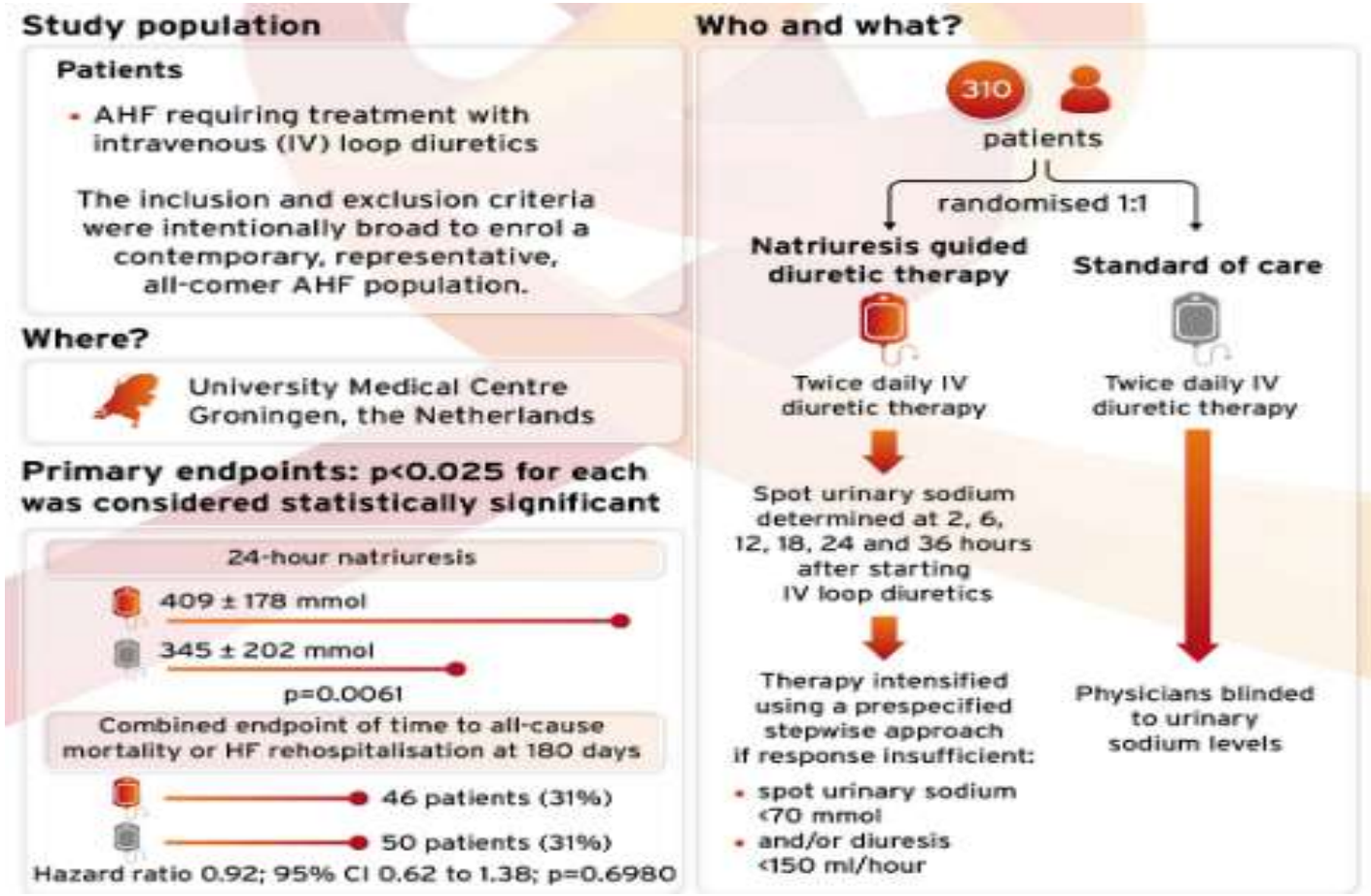
Primary Outcome Components



Improved 24-Hour Diuresis with Dapagliflozin

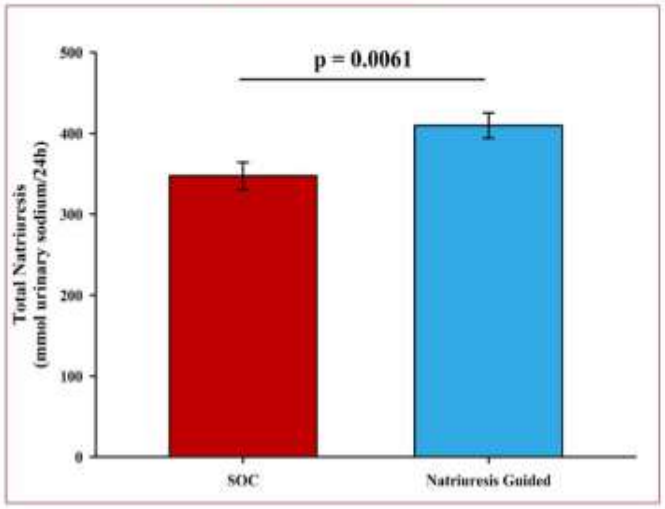


The Pragmatic Urinary Sodium-based treatment algoritHm in Acute Heart Failure (PUSH-AHF) trial

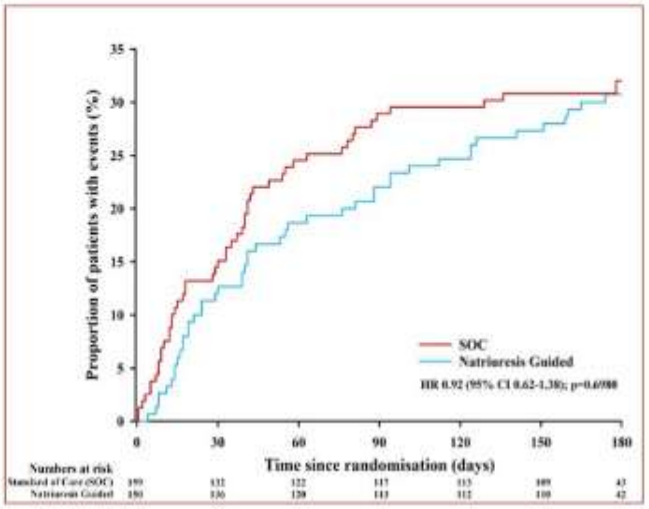


The Pragmatic Urinary Sodium-based treatment algoritHm in Acute Heart Failure (PUSH-AHF) trial

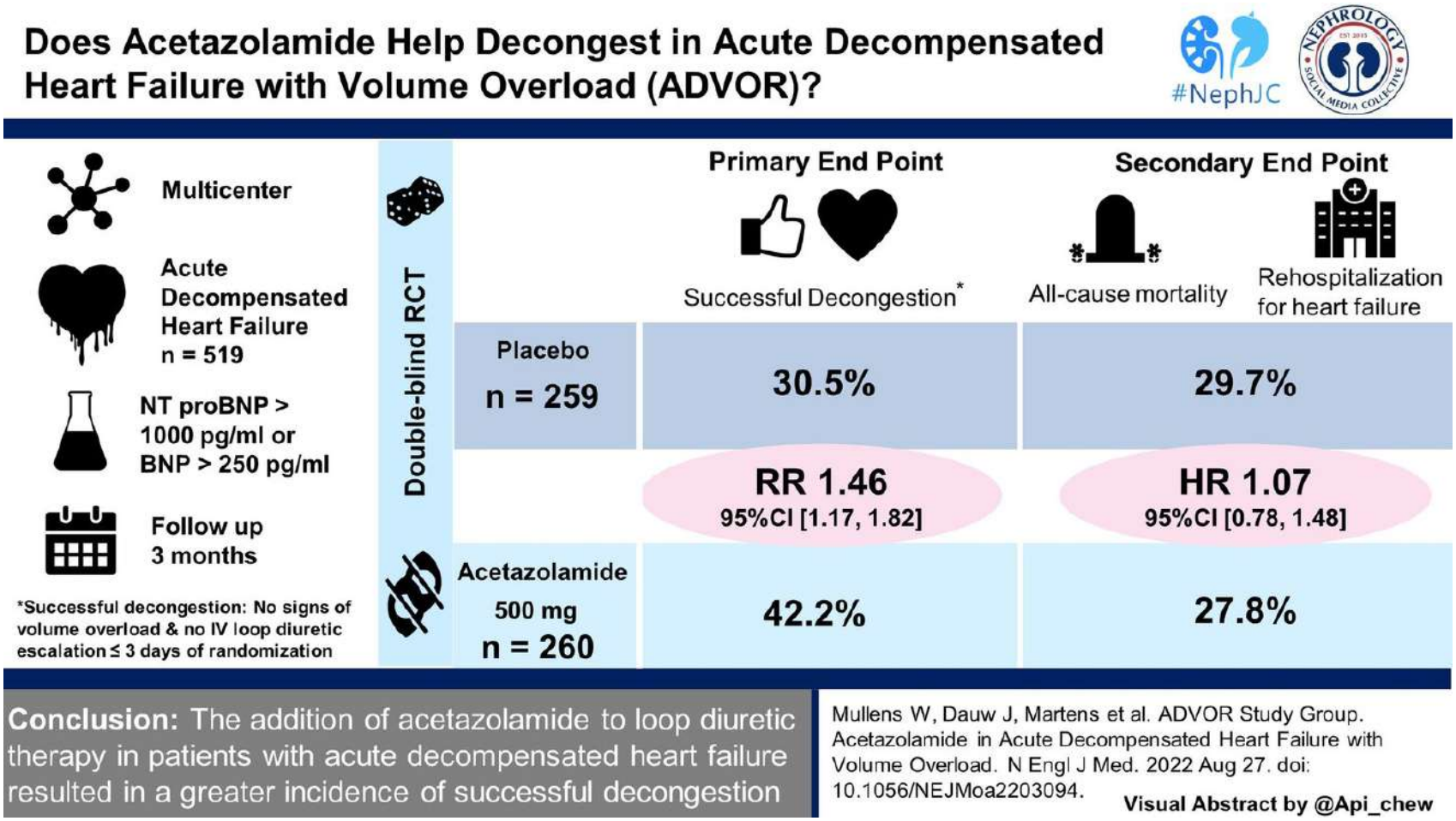
Natriuresis



180-day all-cause mortality or adjudicated heart failure rehospitalization



Acetazolamide



ATTRibute-CM: Study Design

30-month primary endpoint:
Hierarchical analysis consisting of all-cause mortality, cumulative frequency of CVH, change from baseline in NT-proBNP, and change from baseline in 6MWD

Key eligibility criteria

- Subjects with diagnosed ATTR-CM (WT or variant)
- NYHA Class I-III
- ATTR-positive biopsy or 99mTc scan
- Light chain amyloidosis excluded if diagnosis by 99mTc

Screening and randomization

800 mg acoramidis HCl twice daily
N = 421

placebo twice daily
N = 211

Efficacy assessment included 611 participants in the pre-specified mITT population (eGFR ≥30 mL/min/1.73 m²)

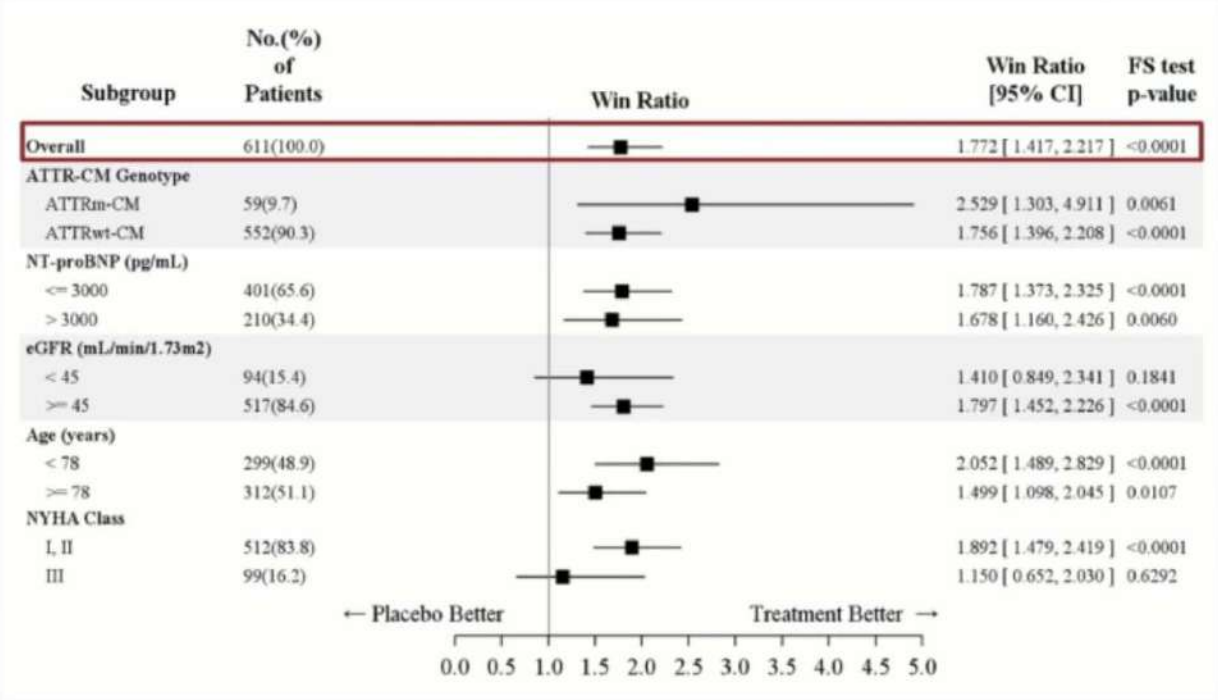
Tafamidis usage allowed after Month 12

800 mg acoramidis HCl twice daily

Open-label extension

6MWD = Six-minute walk distance; NYHA = New York heart association; 99mTc = Technetium labeled pyrophosphate (PYP) or bisphosphonate (e.g., DPD); mITT = Modified intent-to-treat. eGFR = Estimated glomerular filtration rate. ClinicalTrials.gov identifier: NCT03860935.

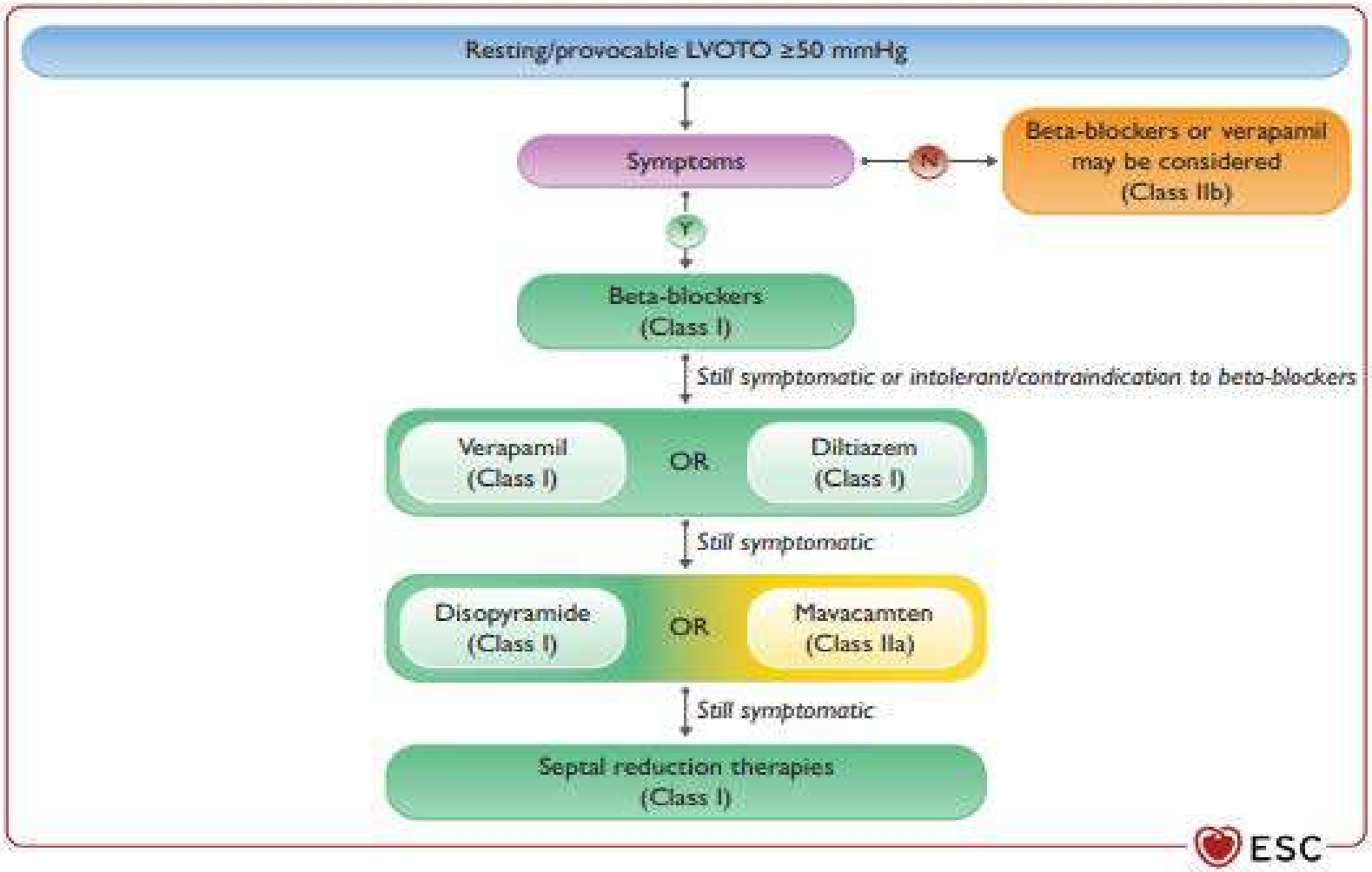
ATTRibute-CM: Primary Outcome Overall and by Subgroups



FS = Finkelstein-Schoenfeld; CI = Confidence interval.

Mavacamten

- Cardiac myosin adenosine triphosphatase inhibitör
- VALOR-HCM trial ,HCM and symptomatic LVOTO, improvements in LVOT gradients and symptoms,need for septal reduction therapy
- EXPLORER-HCM trial showed peak oxygen uptake
- EXPLORER-HCM and MAVA-LTE studies showed that mavacamten benefits were reproduced and maintained regardless of beta-blocker use


Resting/provocable LVOTO ≥50 mmHg
Symptoms
N
Beta-blockers or verapamil may be considered (Class IIb)
Y
Beta-blockers (Class I)
Still symptomatic or intolerant/contraindication to beta-blockers
Verapamil (Class I)
OR
Diltiazem (Class I)
Still symptomatic
Disopyramide (Class I)
OR
Mavacamten (Class IIa)
Still symptomatic
Septal reduction therapies (Class I)
ESC

Anti-inflammatuar Therapy

- Il-6 antagonist: Ziltivecimab(HERMES study)
- Selective myeloperoxidase inhibitor: Mitiperstat (ENDEAVOR Study)

Omega-3 Suplementation

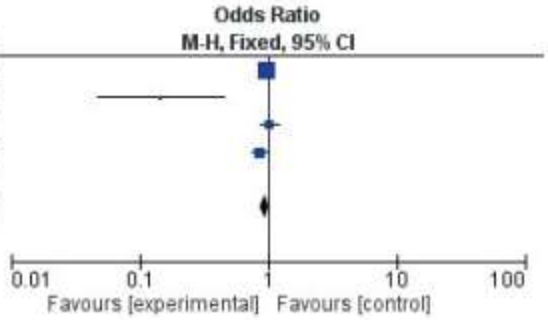
JLA Journal of Lipid and Atherosclerosis

Omega-3 Supplementation and Heart Failure

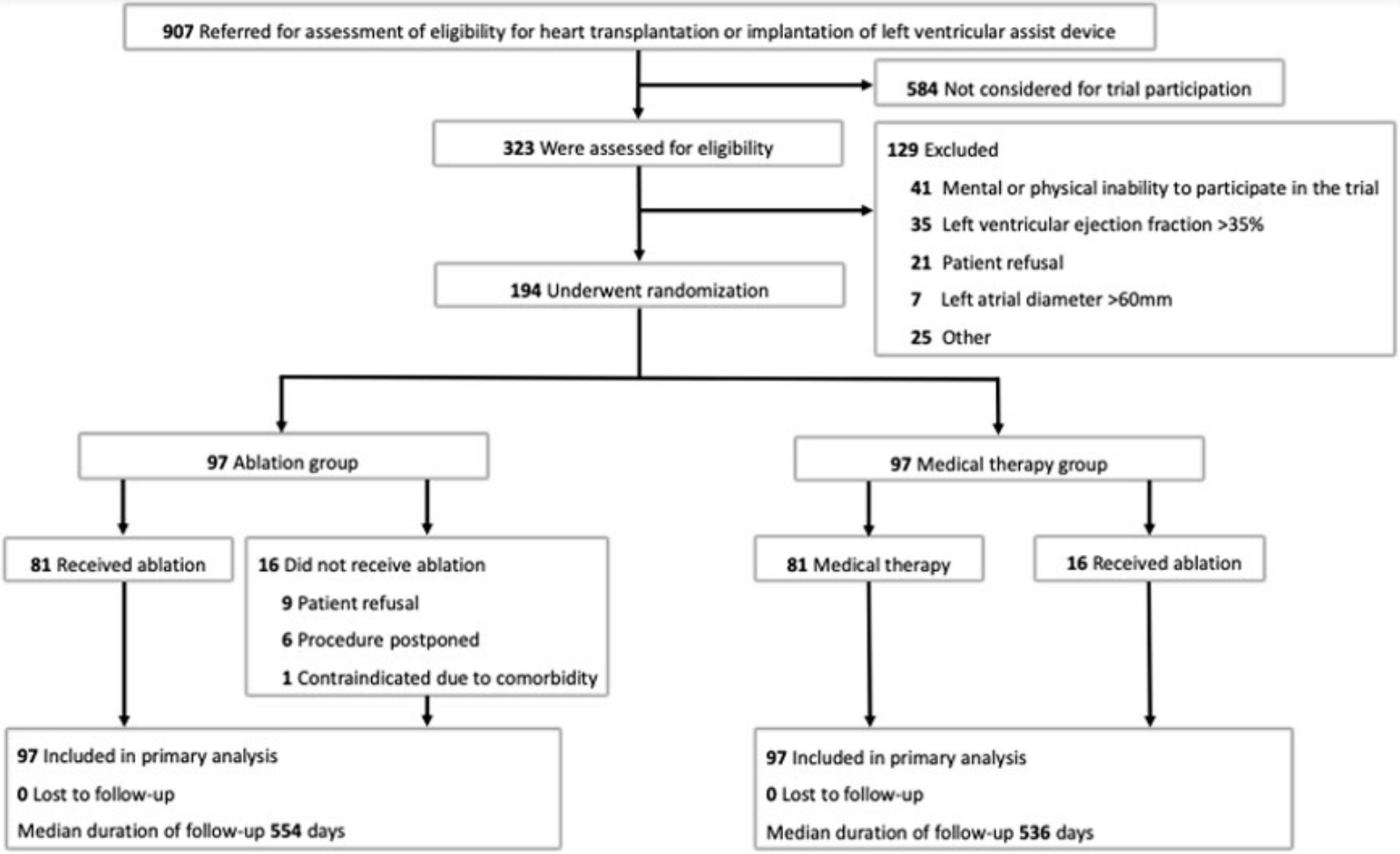
Study or Subgroup	Experimental Events	Experimental Total	Control Events	Control Total	Weight	Odds Ratio M-H, Fixed, 95% CI
GISSI-HF	978	3494	995	3481	50.9%	0.97 [0.88, 1.08]
Nodari	4	67	20	66	1.3%	0.15 [0.05, 0.46]
ORIGIN	331	6281	320	6255	21.5%	1.03 [0.88, 1.21]
VITAL-HF	326	12933	379	12938	26.2%	0.86 [0.74, 1.00]
Total (95% CI)		**22775**		**22740**	**100.0%**	**0.94 [0.88, 1.02]**
Total events	1639		1714			

Heterogeneity: Chi² = 13.42, df = 3 (P = 0.004); I² = 78%

Test for overall effect: Z = 1.53 (P = 0.13)

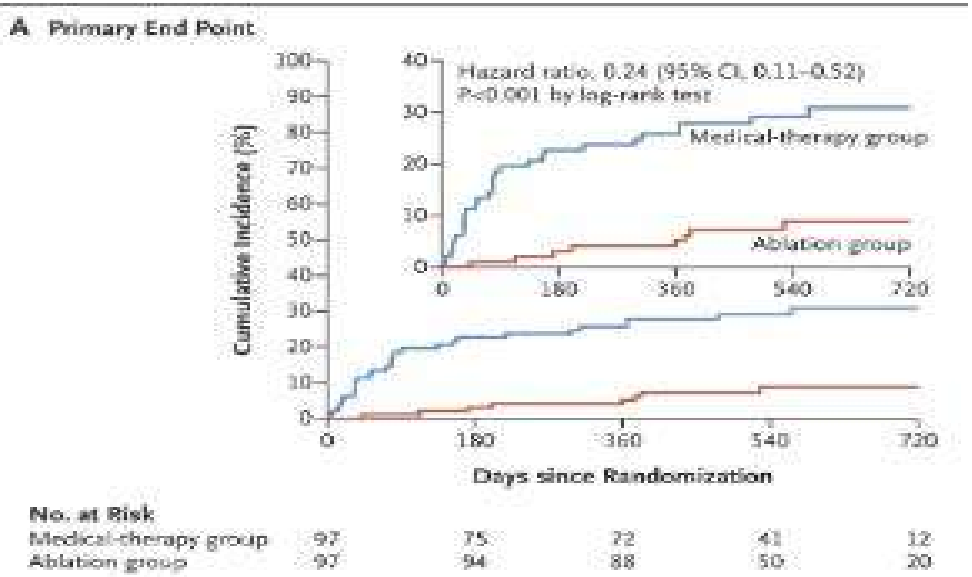


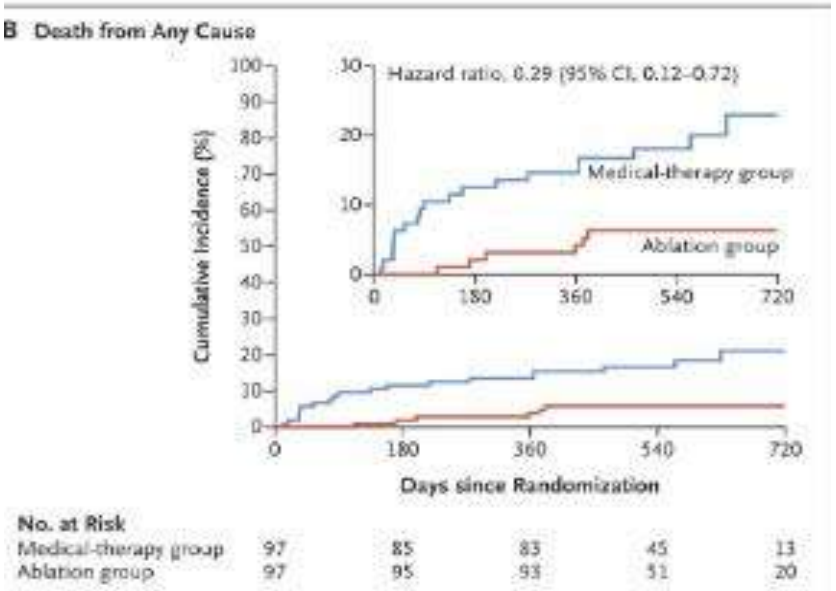
AF ABLATION:
CASTLE-HTx

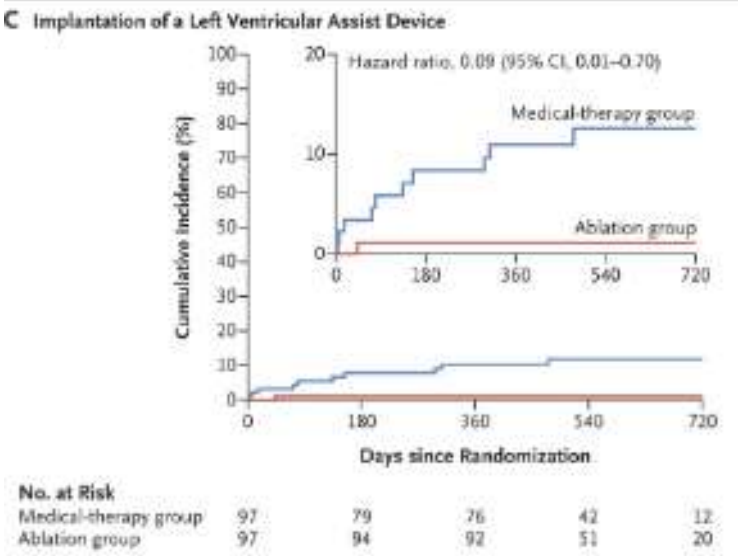


CASTLE-HTx - Supplementary data - Figure S1. Enrollment, Randomization, and Follow-up

CASTLE-HTx


A Primary End Point
Cumulative Incidence (%)
Hazard ratio, 0.24 (95% CI, 0.11–0.52)
P<0.001 by log-rank test
Medical-therapy group
Ablation group
Days since Randomization
No. at Risk
Medical-therapy group 97 75 72 41 12
Ablation group 97 94 88 50 20


B Death from Any Cause
Cumulative Incidence (%)
Hazard ratio, 0.29 (95% CI, 0.12–0.72)
Medical-therapy group
Ablation group
Days since Randomization
No. at Risk
Medical-therapy group 97 85 83 45 13
Ablation group 97 95 93 51 20


C Implantation of a Left Ventricular Assist Device
Cumulative Incidence (%)
Hazard ratio, 0.09 (95% CI, 0.01–0.70)
Medical-therapy group
Ablation group
Days since Randomization
No. at Risk
Medical-therapy group 97 79 76 42 12
Ablation group 97 94 92 51 20

CRT Upgrade

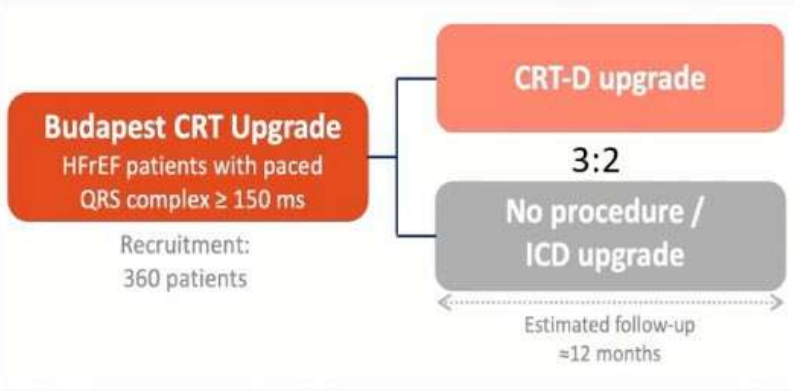
BUDAPEST CRT Upgrade - Study design

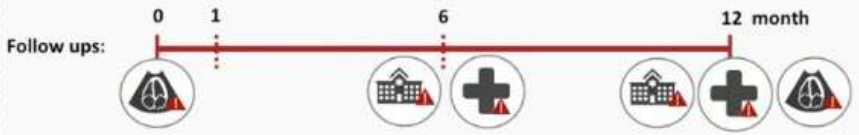
BP CRT

A Multicentre, Randomised, Controlled, Investigator-initiated Trial testing the hypothesis that CRT-D upgrade compared to ICD only would be associated with improved clinical outcomes

Key Inclusion Criteria: HFrEF patients with a prior pacemaker or ICD, RV pacing 20-100%, paced QRS complex ≥ 150 ms and GDMT

Key Exclusion Criteria: intrinsic QRS with LBBB morphology, severe renal dysfunction, severe RV dilatation, ACS events





COMPOSITE PRIMARY ENDPOINT

The first occurrence of

- HF hospitalisation,
- all-cause mortality,
- or < 15% reduction in LVESV from baseline to 12-month.

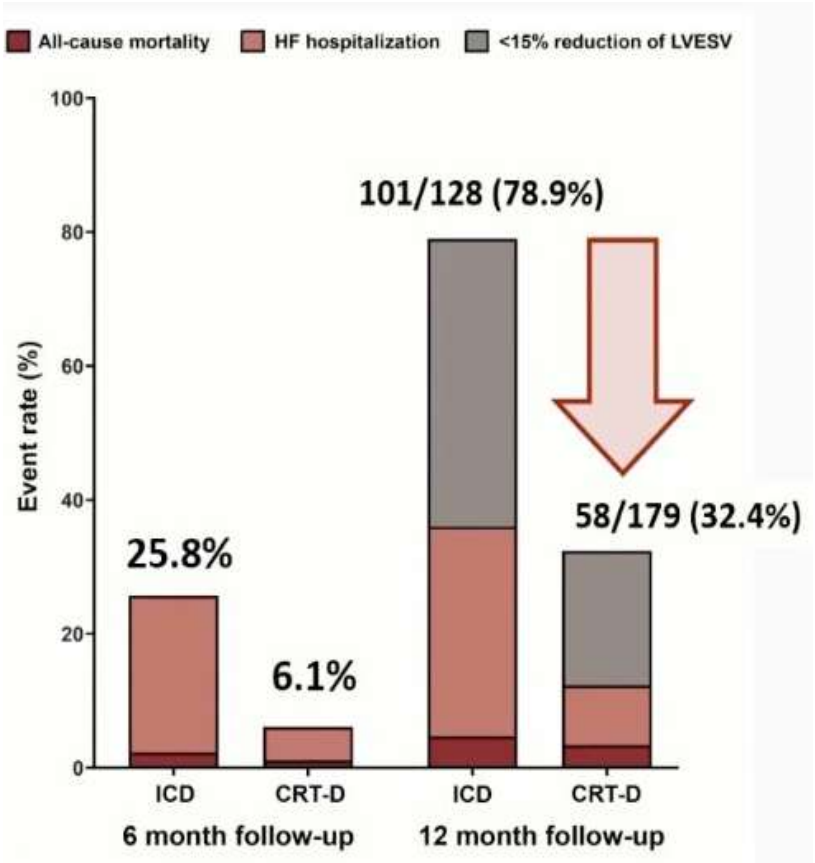
SECONDARY ENDPOINTS

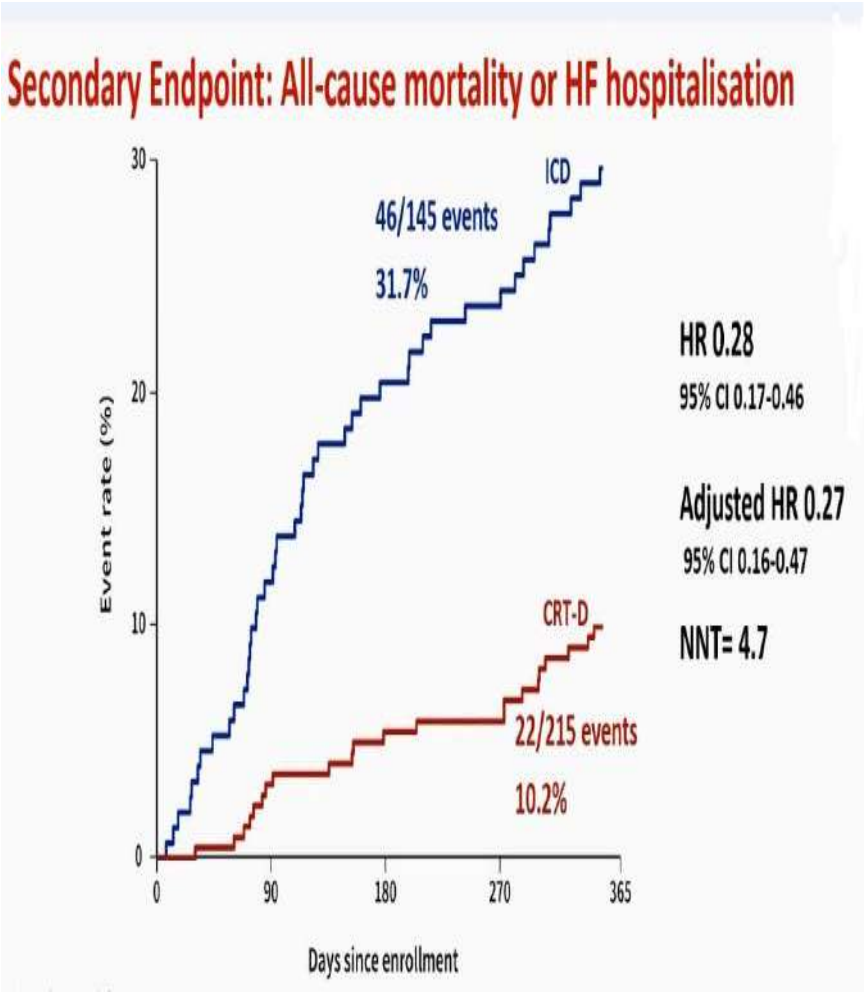
1. Composite endpoint of HF hospitalisation and all-cause mortality
2. All-cause mortality
3. LVEDV and LVEF changes

ESC Congress 2023
Amsterdam & Online

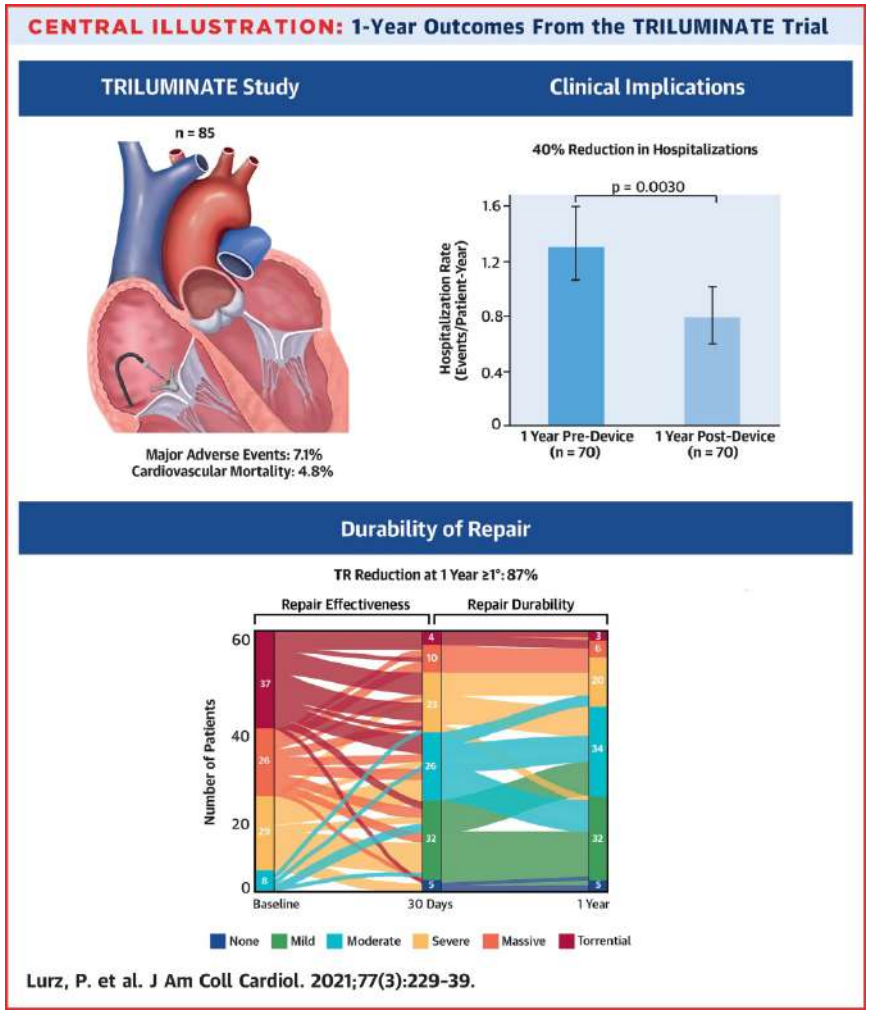
Merkely et al, Eur J Heart Fail. 2022 Sep;24(9):1652-1661, doi: 10.1002/ejhf.2609.

BUDAPEST CRT Upgrade





T-TEER and M-TEER



New Perspectives

nature reviews cardiology

Review Article | Published: 10 April 2024

Cardiovascular disease and cancer: shared risk factors and mechanisms

Nicholas S. Wilcox, Uri Amit, Jacob B. Reibel, Eva Berlin, Kendyl Howell & Bonnie Ky

Nature Reviews Cardiology (2024) | Cite this article

Future Research Area

Cureus
Part of SPRINGER NATURE

Open Access Review Article

DOI: 10.7759/cureus.59661

Artificial Intelligence and Its Role in Diagnosing Heart Failure: A Narrative Review

Review began 04/25/2024
Review ended 05/01/2024

Diptiman Medhi [1], Sushmitha Reddy Kamidi [2], Kannuru Paparaju Mamatha Sree [3], Shifa Shaikh [4], Shanida Rasheed [5], Abdul Hakeem Thengu Murichathil [6], Zahra Nazir [7]

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The Role of Artificial Intelligence in Coronary Artery Disease and Atrial Fibrillation

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Medical and surgical interventions specific to HF patients rely significantly on early identification of HF. Hospitalization and treatment costs for HF are high, with readmissions increasing the burden. AI can help improve diagnostic accuracy by recognizing patterns and using them in multiple areas of HF management. AI has shown promise in offering early detection and precise diagnoses with the help of ECG analysis, advanced cardiac imaging, leveraging biomarkers, and cardiopulmonary stress testing. However, its challenges include data access, model interpretability, ethical concerns, and generalizability across diverse populations. Despite these ongoing efforts to refine AI models, it suggests a promising future for HF diagnosis. After applying exclusion and inclusion criteria, we searched for data available on PubMed, Google Scholar, and the Cochrane Library and found 150 relevant papers. This review focuses on AI's significant contribution to HF diagnosis in recent years, drastically altering HF treatment and outcomes.

Thank you for attention…