Review of the 2022 Heart Failure Guidelines

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AHA/ACC/HFSA CLINICAL PRACTICE GUIDELINE

2022 AHA/ACC/HFSA Guideline for the Management of Heart Failure: A Report of the American College of Cardiology/American Heart Association Joint Committee on Clinical Practice Guidelines

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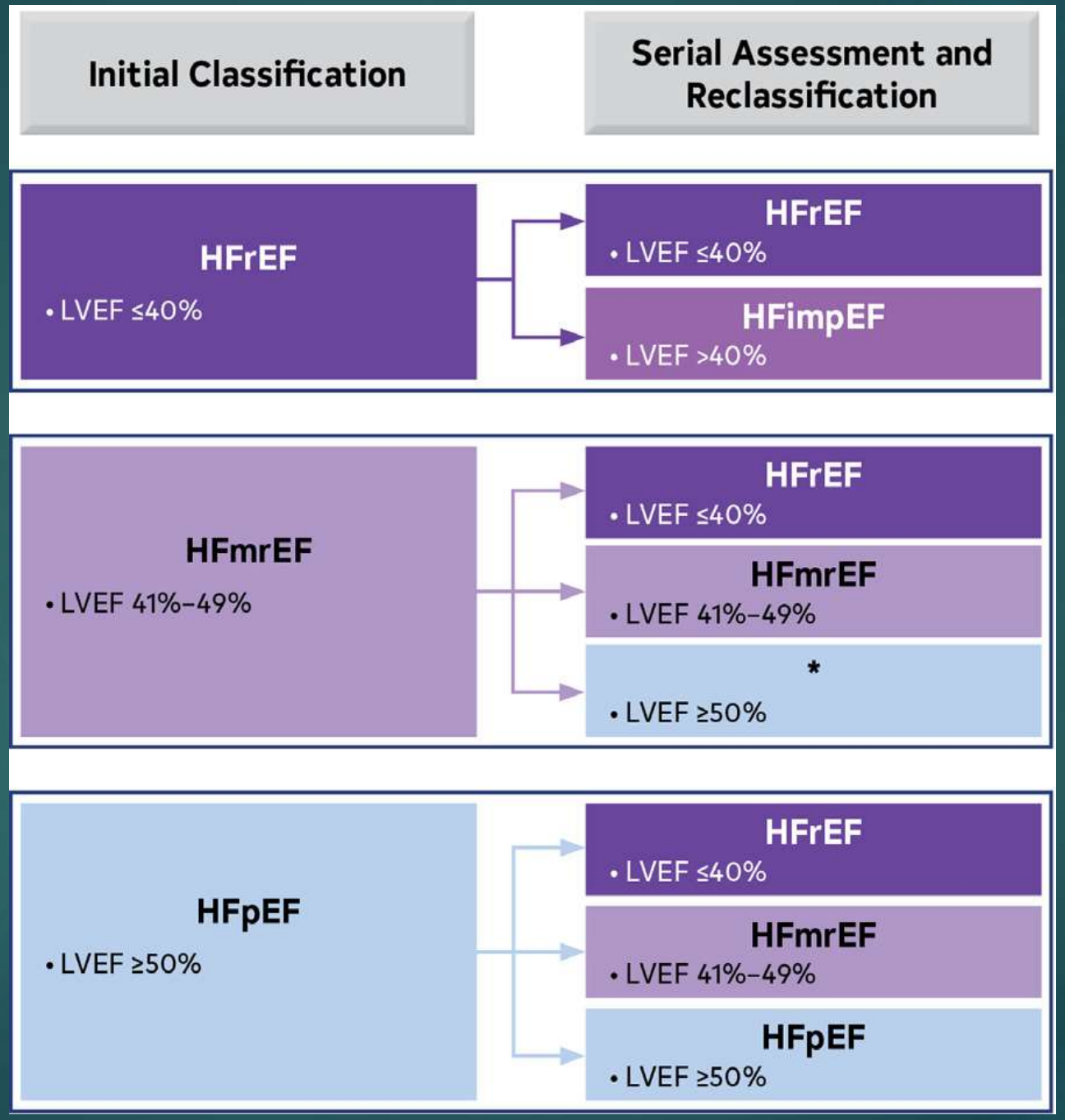

Initial Classification
Serial Assessment and Reclassification
HFrEF
• LVEF ≤40%
HFrEF
• LVEF ≤40%
HFimpEF
• LVEF >40%
HFmrEF
• LVEF 41%–49%
HFrEF
• LVEF ≤40%
HFmrEF
• LVEF 41%–49%
*
• LVEF ≥50%
HFpEF
• LVEF ≥50%
HFrEF
• LVEF ≤40%
HFmrEF
• LVEF 41%–49%
HFpEF
• LVEF ≥50%

COR	LOE	Recommendation
1	B-R	In patients with HFimpEF after treatment, GDMT should be continued to prevent relapse of HF and left ventricular dysfunction, even in patients who may become asymptomatic.[36]

Non-ischemic cardiomyopathy with recovered EF

Previous dilated CMP
EF<40%
Recovered to >50%
Normal LV size
Normal BNP

Primary end point: relapse
EF decrease by 10% to<50%
LVEDV increase by>10%
2x NT-proBNP to>400
HF

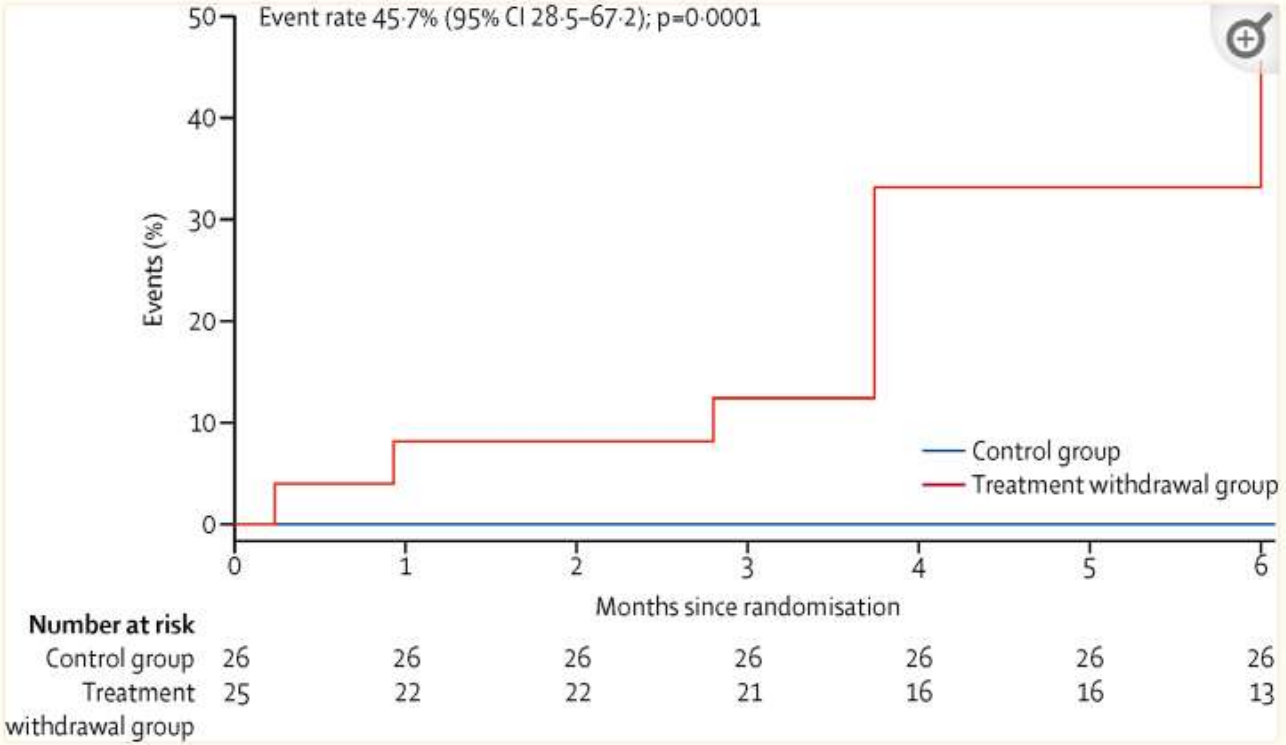


Figure 3

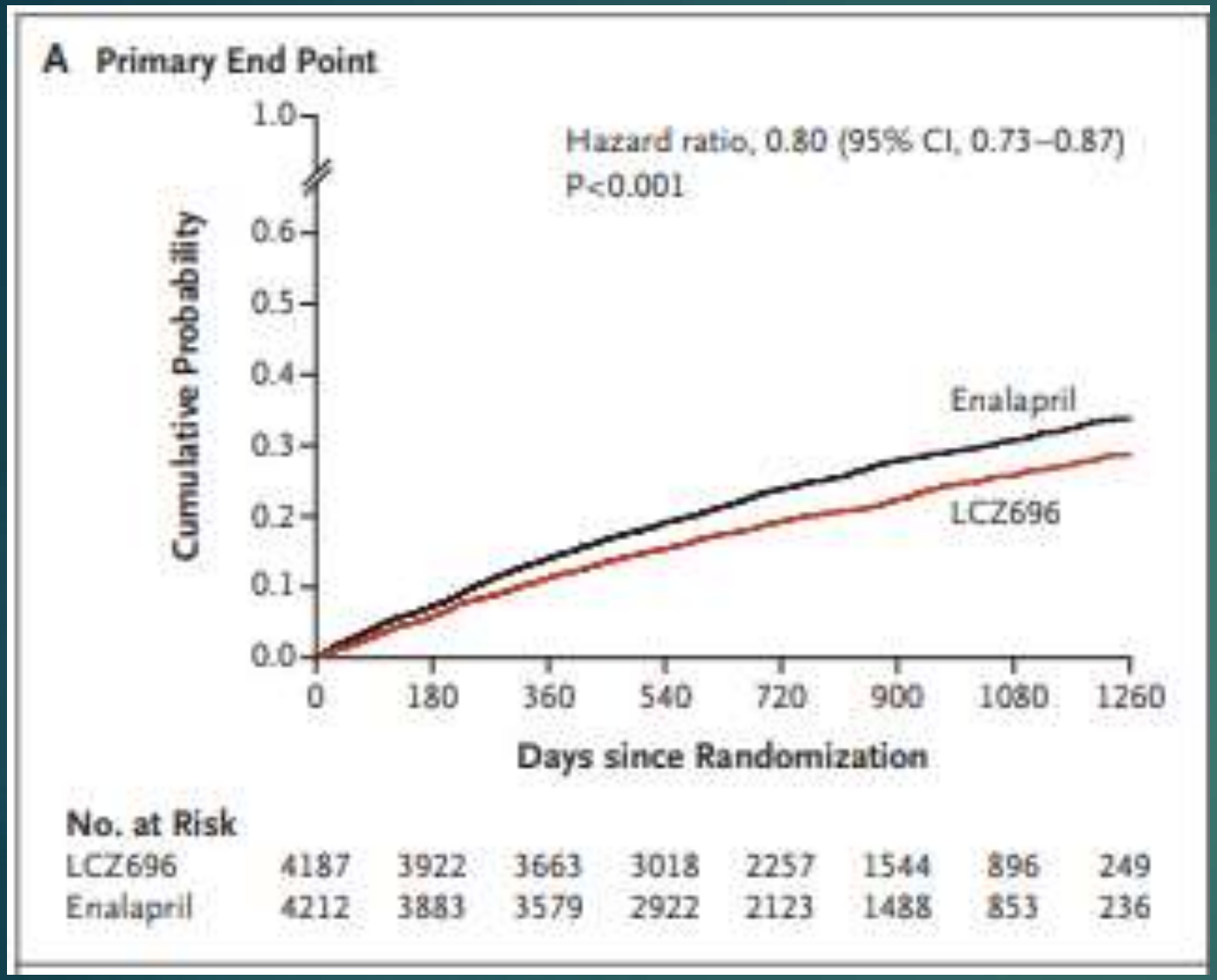
Kaplan-Meier curve of time to primary endpoint in randomised phase, according to treatment group

One patient dropped out at 7 days.

Halliday et al Lancet. 2019 Jan 5; 393(10166): 61–73.

Recommendations for Renin-Angiotensin System Inhibition With ACEi or ARB or ARNi
Referenced studies that support the recommendations are

COR	LOE	Recommendations
1	A	1. In patients with HFrEF and NYHA class II to III symptoms, the use of ARNi is recommended to reduce morbidity and mortality.[1–5]
1	A	2. In patients with previous or current symptoms of chronic HFrEF, the use of ACEi is beneficial to reduce morbidity and mortality when the use of ARNi is not feasible.[6–13]
1	A	of chronic HFrEF who are intolerant to ACEi because of cough or angioedema and when the use of ARNi is not feasible, the use of ARB is recommended to reduce morbidity and mortality.[14–18]
Value Statement: High Value (A)		of chronic HFrEF, in whom ARNi is not feasible, treatment with an ACEi or ARB provides high
1	B-R	5. In patients with chronic symptomatic HFrEF NYHA class II or III who tolerate an ACEi or ARB, replacement by an ARNi is recommended to further reduce morbidity and mortality.[1–5]
Value Statement: High Value (A)		6. In patients with chronic symptomatic HFrEF, treatment with an ARNi instead of an ACEi provides high economic value.[26–29]
3: Harm	B-R	7. ARNi should not be administered concomitantly with ACEi or within 36 hours of the last dose of an ACEi.[30,31]
3: Harm	C-LD	8. ARNi should not be administered to patients with any history of angioedema.[32–35]
3: Harm	C-LD	9. ACEi should not be administered to patients with any history of angioedema.[36–39]



EF</=40%
NYHA II-IV (>99% NYHA II-III)

Randomized

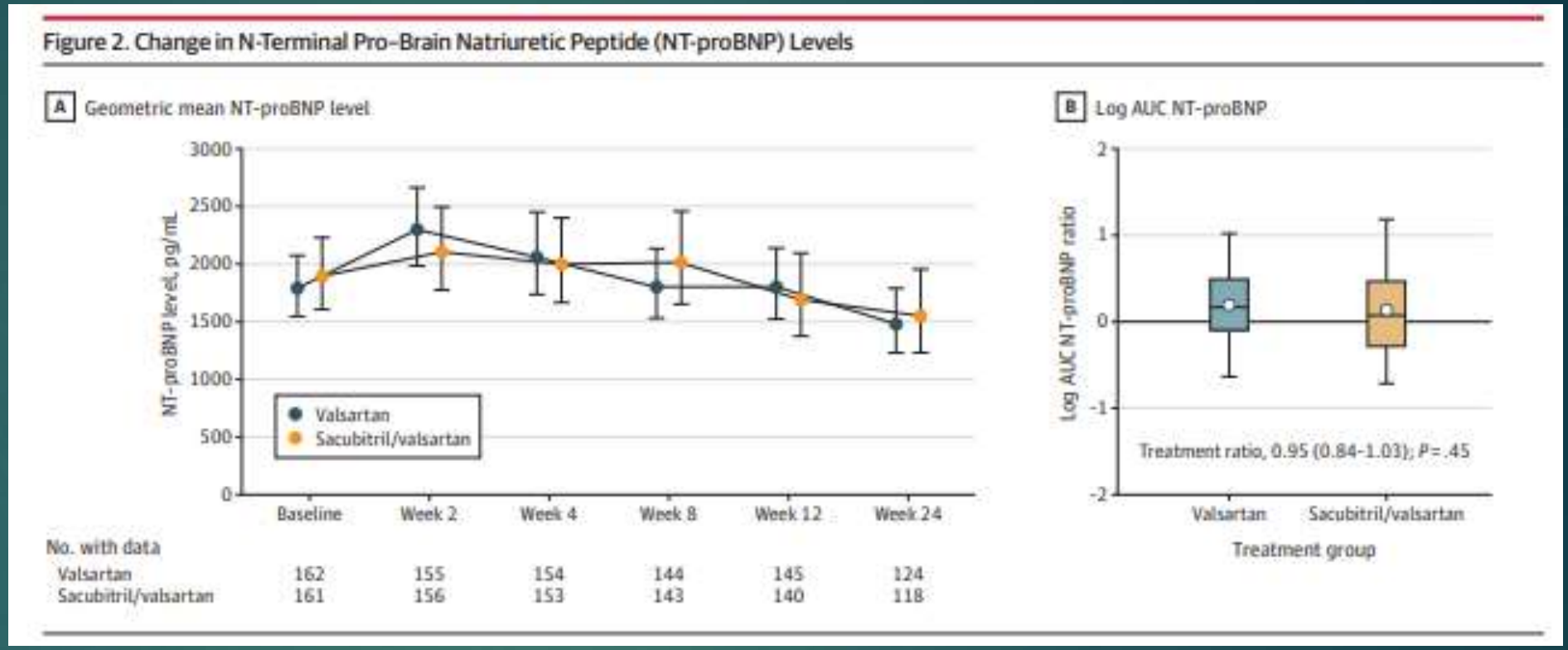
LCZ696 200 mg twice daily
or enalapril 10 mg twice daily

The primary outcome: a composite of death from CV causes or hospitalization for HF

Paradigm-HF McMurrey N Engl J Med . 2014 Sep 11;371(11):993-1004.

- EF</=35%
- NYHA IV
- sacubitril/valsartan (target dose, 200 mg twice daily)

  or valsartan (target dose, 160 mg twice daily)



Primary endpoint: change in NTproBNP after 24 weeks of therapy

The Life trial Mann JAMA Cardiol . 2022 Jan 1;7(1):17-25.

TABLE 1 Reasons for Discontinuation of Sacubitril/Valsartan During Run-In[a]

Reason	Number
Systolic arterial blood pressure <90 mm Hg with symptoms of hypotension	23
Systolic arterial blood pressure <90 mm Hg without symptoms of hypotension	20
Symptoms of hypotension/dizziness with systolic arterial blood pressure >90 mm Hg	14
Renal dysfunction (creatinine >2 mg/dL)	9
Hyperkalemia	2
Possible allergic reaction or rash	5
Other	7

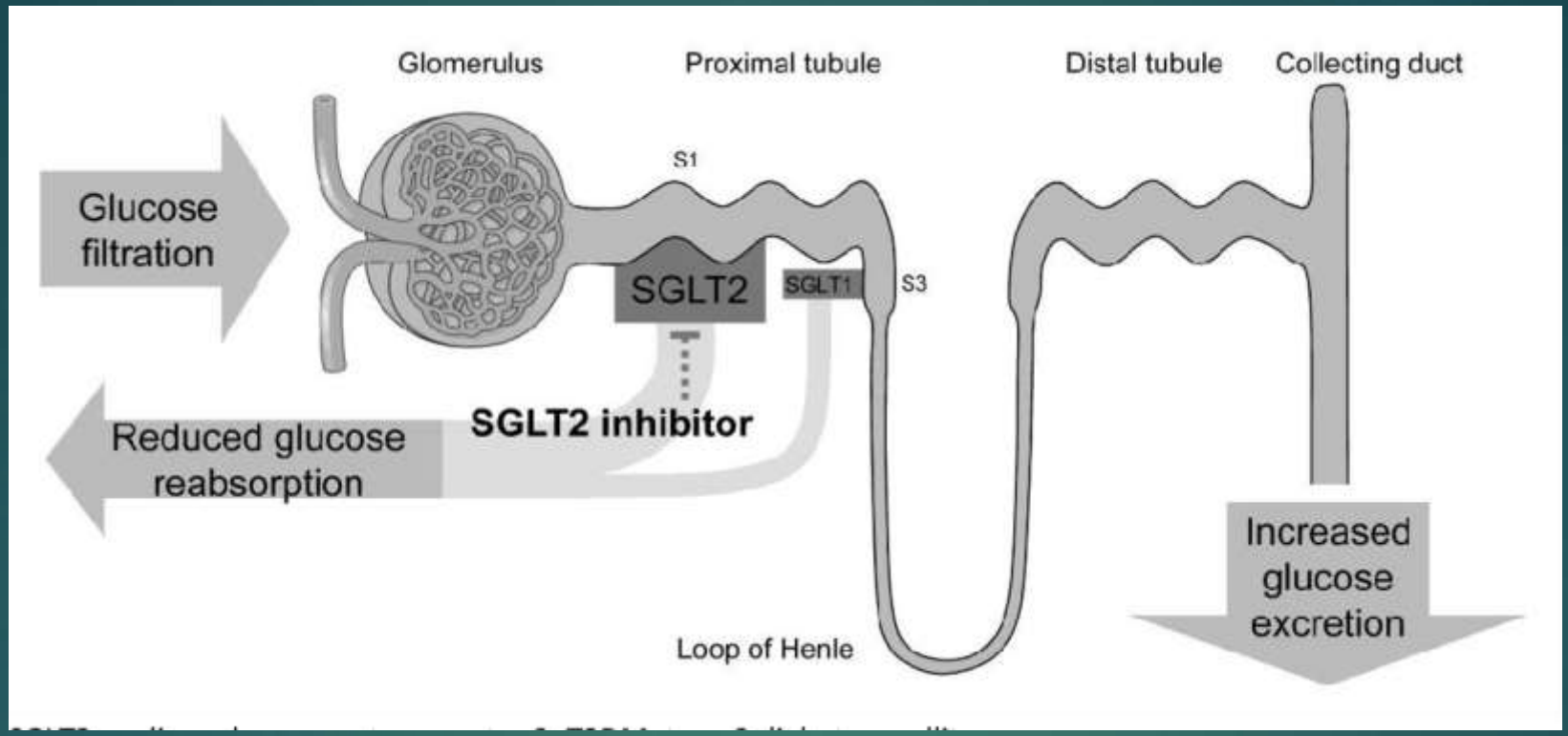
[a]Multiple reasons may be selected for one subject discontinuation.

18% were intolerant of sacubitril/valsartan

SGLT2i

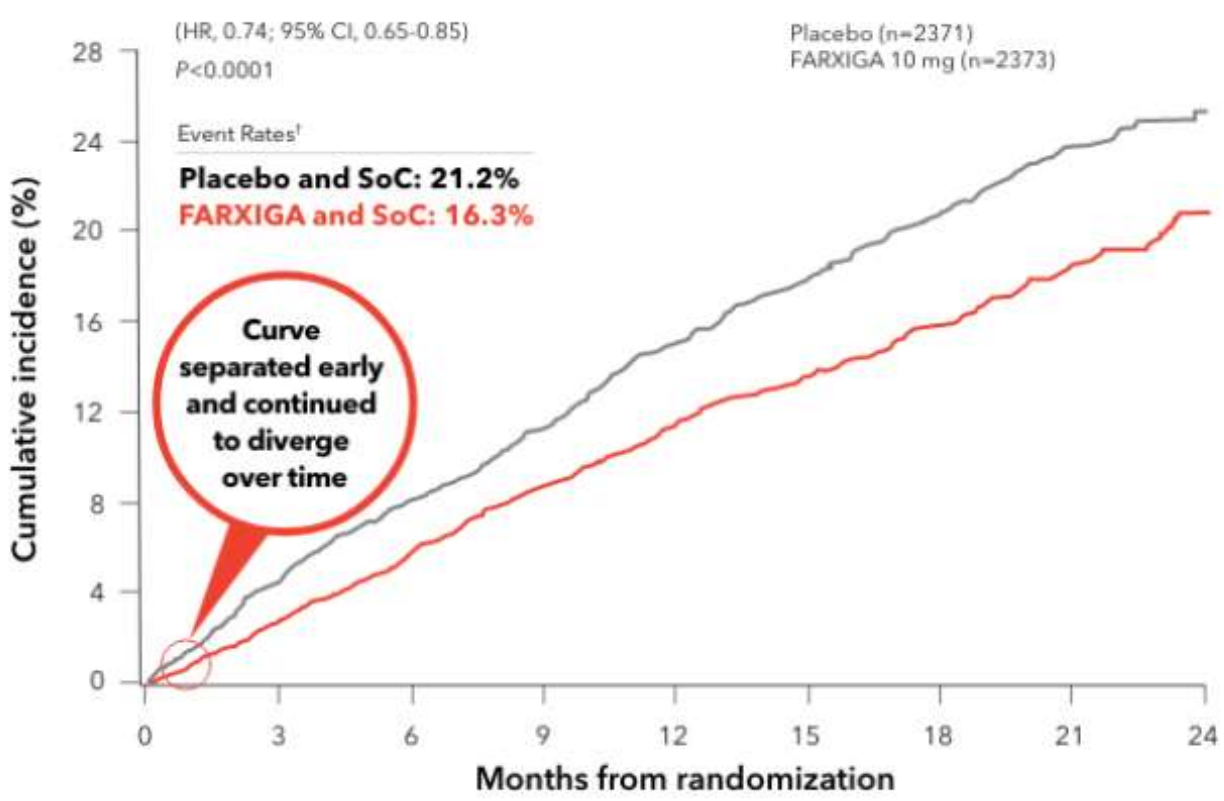
Guideline-directed medical therapy for HF with reduced EF now includes 4 medication classes, including sodium-glucose cotransporter-2 inhibitors (SGLT2i).

COR	LOE	Recommendation
1	A	In patients with symptomatic chronic HFrEF, an SGLT2i is recommended to reduce hospitalization for HF and cardiovascular mortality, irrespective of the presence of type 2 diabetes.[31,32]



SGLT2 inhibitors- Inhibit 30-50% of Renal Glucose Absorption

Primary end point: Composite of CV death or hospitalization for heart failure[1,2,*]



↓ 26% RRR

4.9% ARR

NNT=21

DAPA-HF

NYHA class II,III,IV

EF <40%

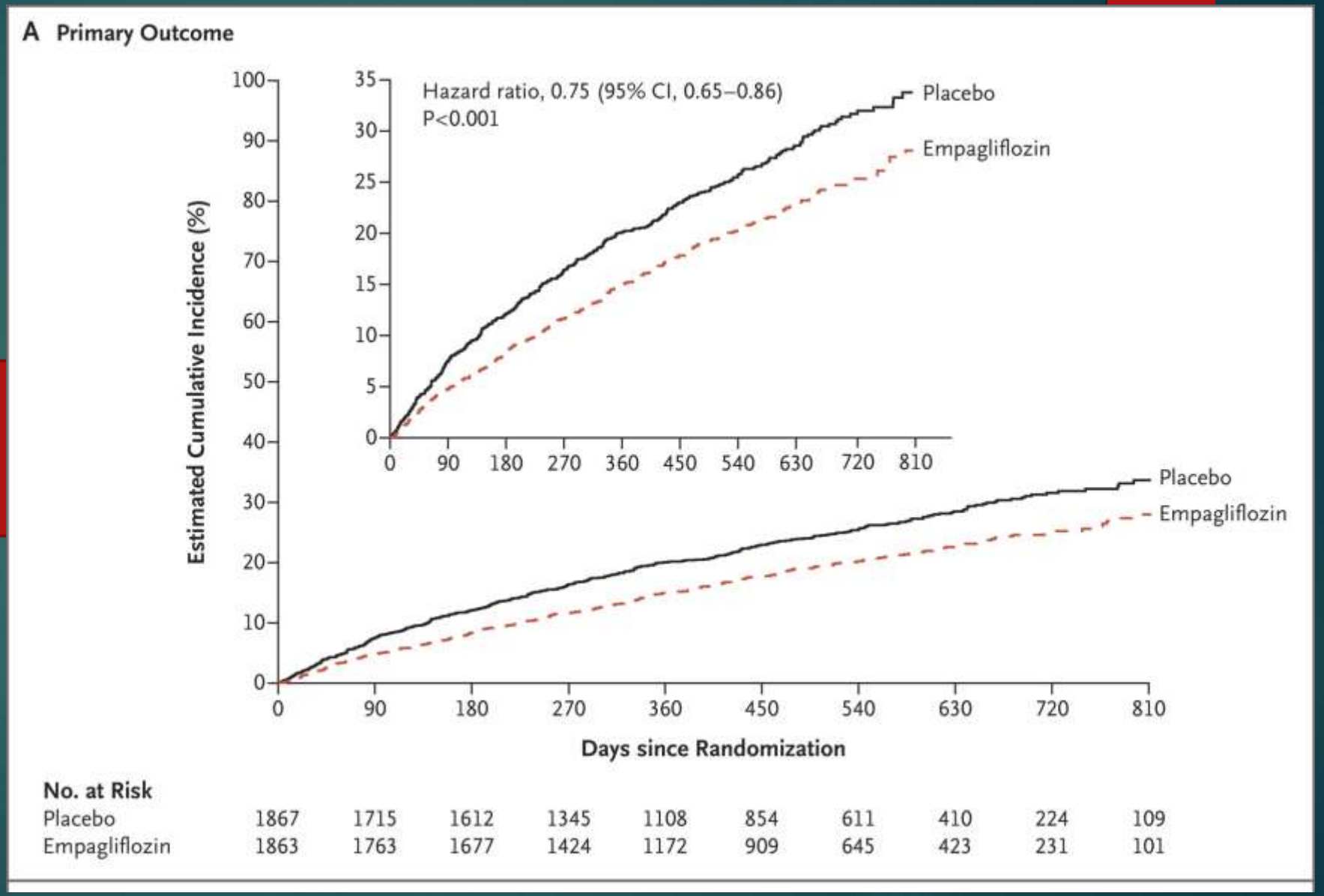
With or without Diabetes

CV death	Hospitalization for heart failure
↓ 18% RRR	↓ 30% RRR
P=0.0294	*P*<0.0001
(HR, 0.82; 95% CI, 0.69-0.98)	(HR, 0.70; 95% CI, 0.59-0.83)
1.9% ARR†	3.7% ARR†

EMPEROR Reduced

Empagliflozin

3700 patients
NYHA II,III,IV
EF <40%



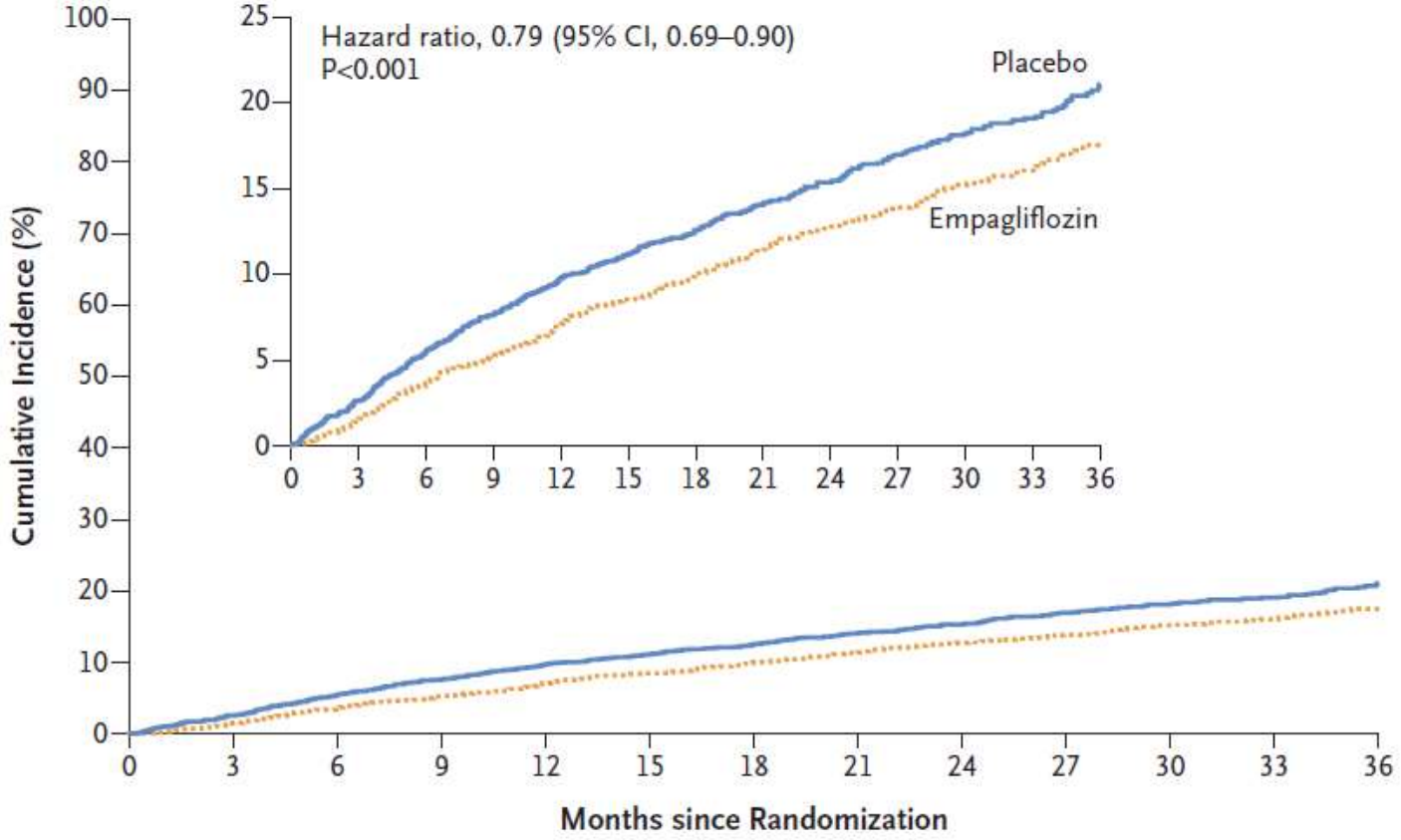
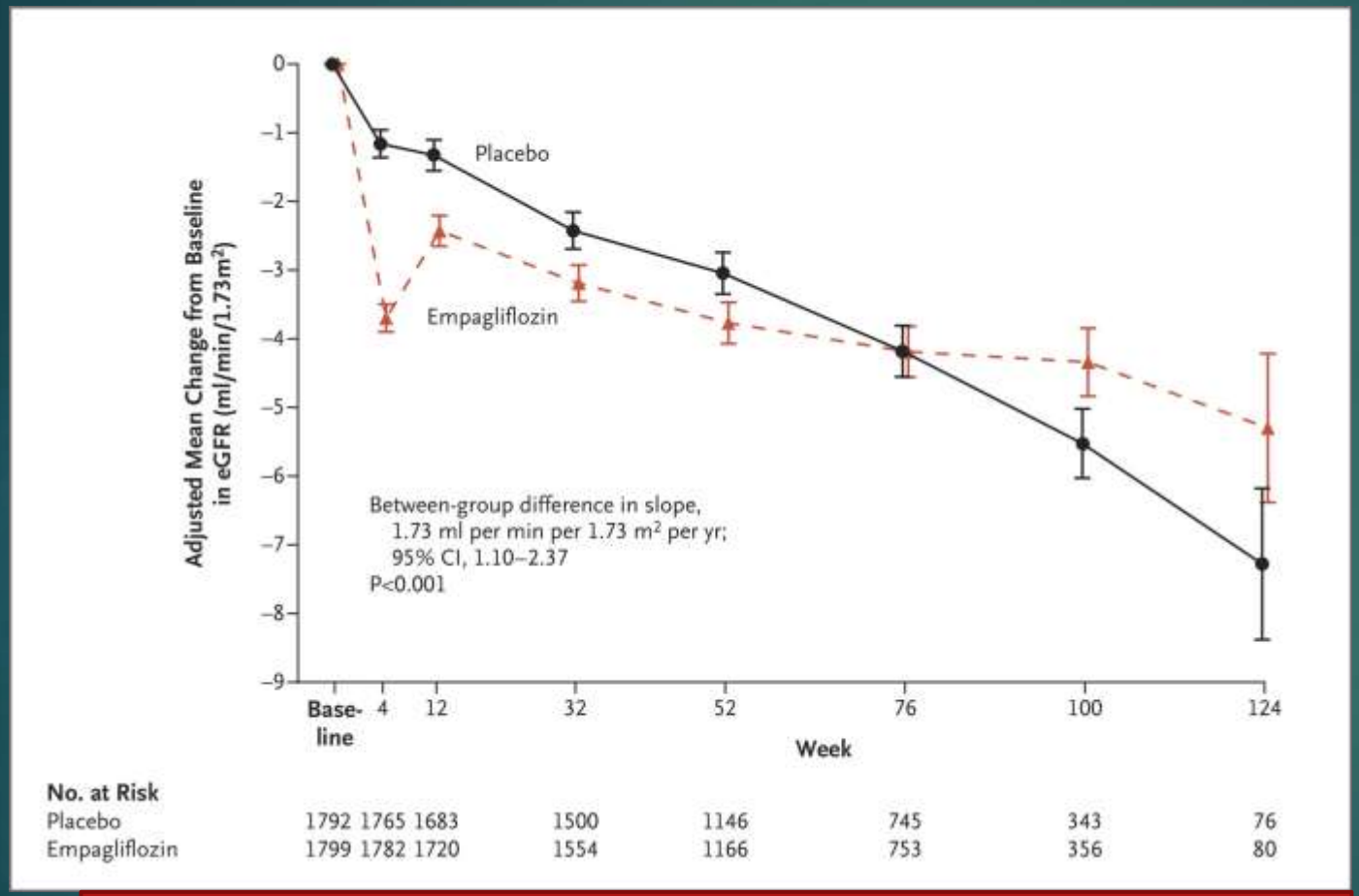


Figure 1. Primary Outcome, a Composite of Cardiovascular Death or Hospitalization for Heart Failure.
The estimated cumulative incidence of the primary outcome in the two groups is shown. The inset shows the data on an expanded y axis.

Anker et al EMPEROR-preserved

EF >40%
NYHA class II,III,IV
LAE or LVH
BMI <45
Stable diuretic dose

EMPEROR- Reduced- Renal benefits
Slower decline in GFR in SGLT 2 inhibitor group

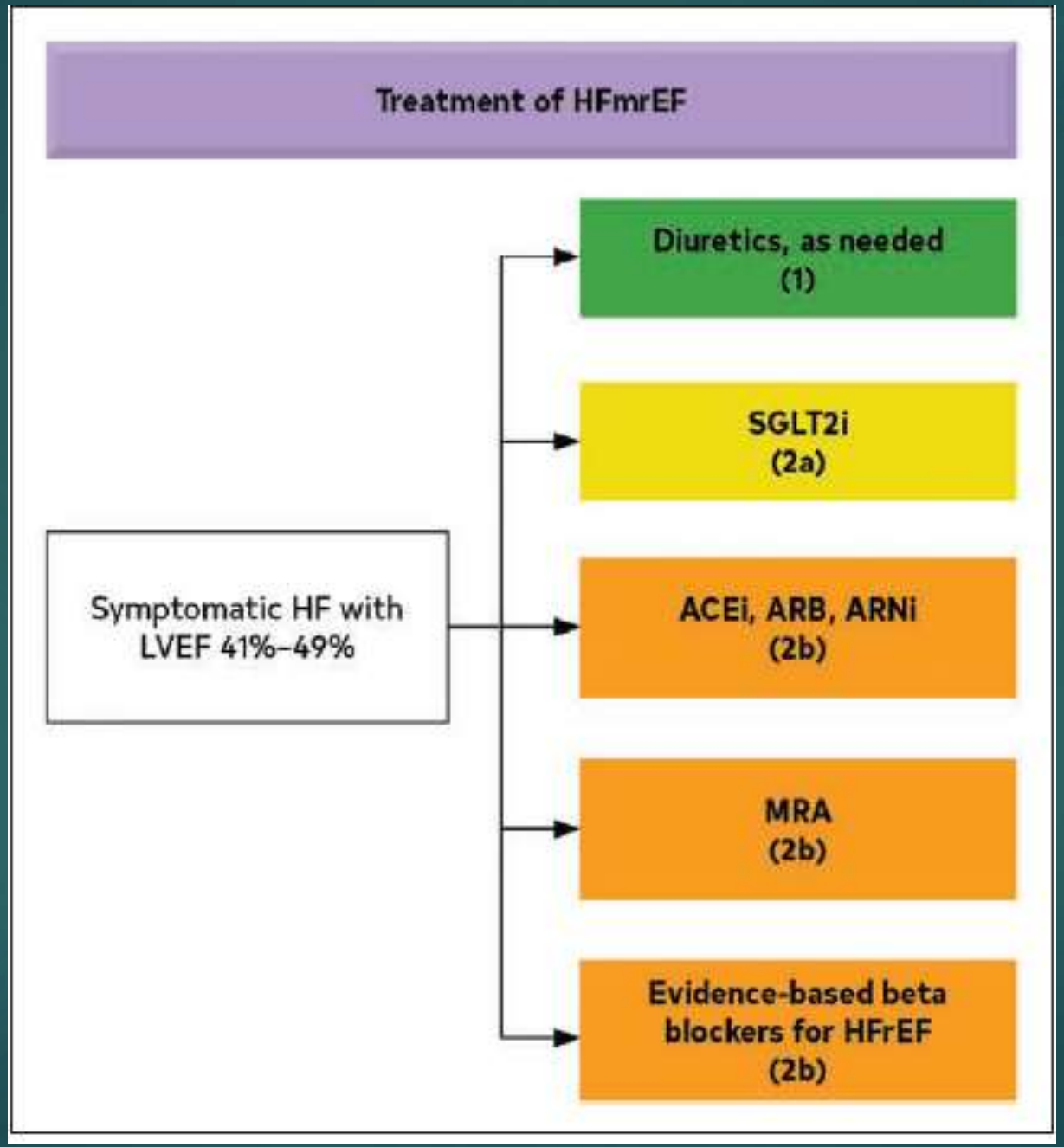


Secondary outcome

Decline in GFR -0.55 vs- 2.28ml/1.73 body surface area/year

50% Decrease in Renal Events

p<0.001


Treatment of HFmrEF
Symptomatic HF with LVEF 41%–49%
Diuretics, as needed (1)
SGLT2i (2a)
ACEi, ARB, ARNi (2b)
MRA (2b)
Evidence-based beta blockers for HFrEF (2b)

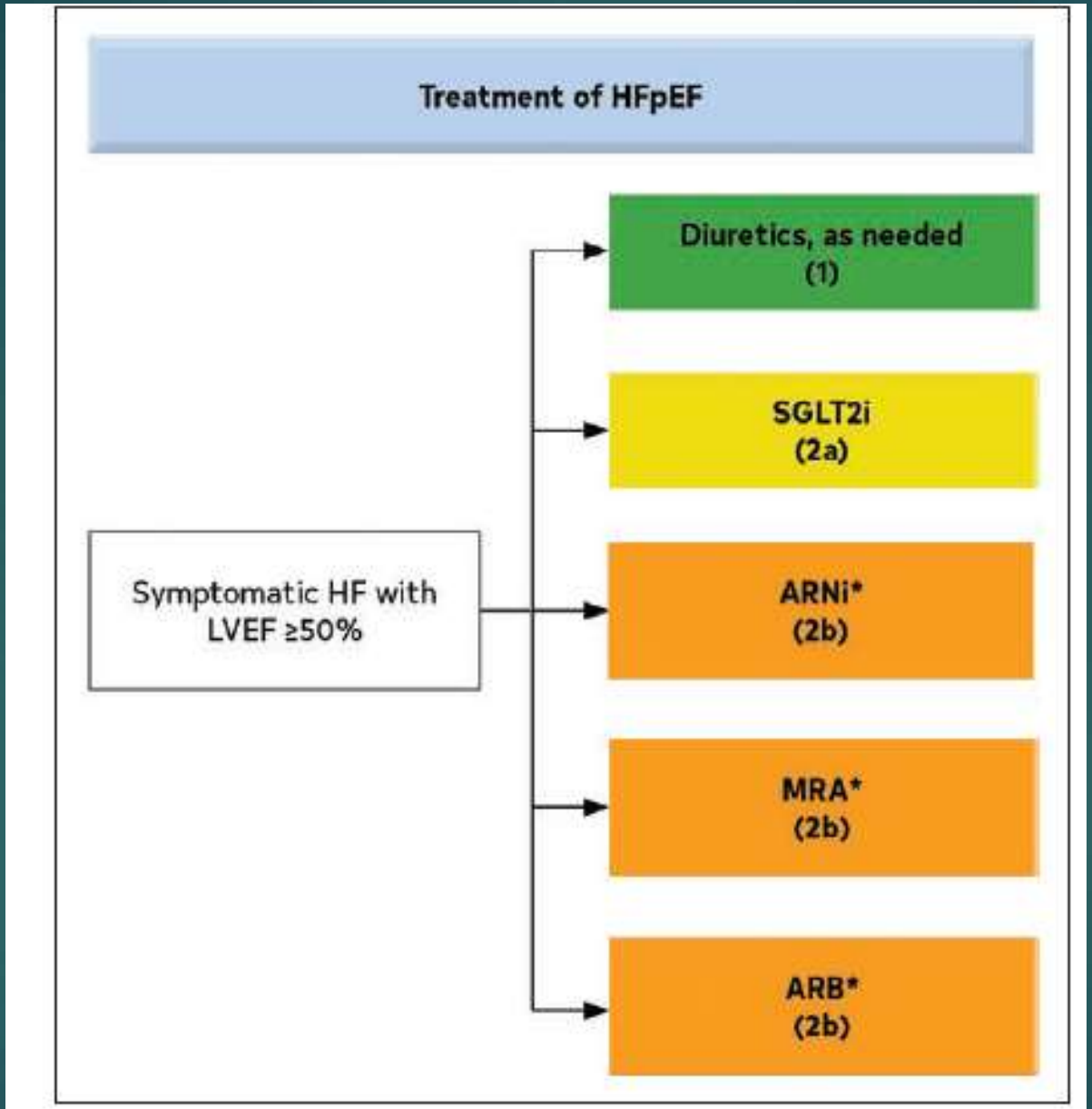
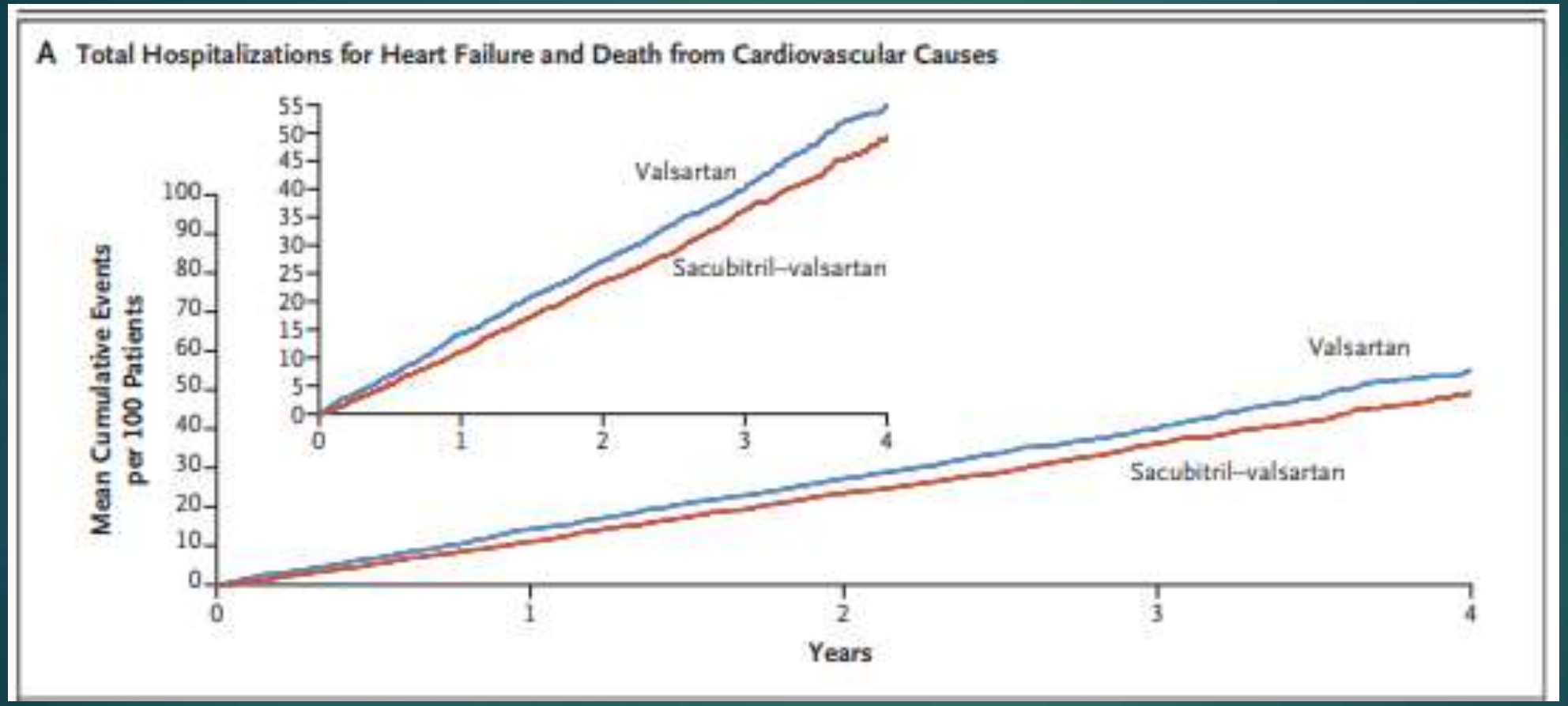


Figure 12. Recommendations for Patients With Preserved LVEF (≥50%).

PARAGON HF, p=0.06



NYHA) class II to IV EF 45% or higher, elevated level of natriuretic peptides, and structural heart disease

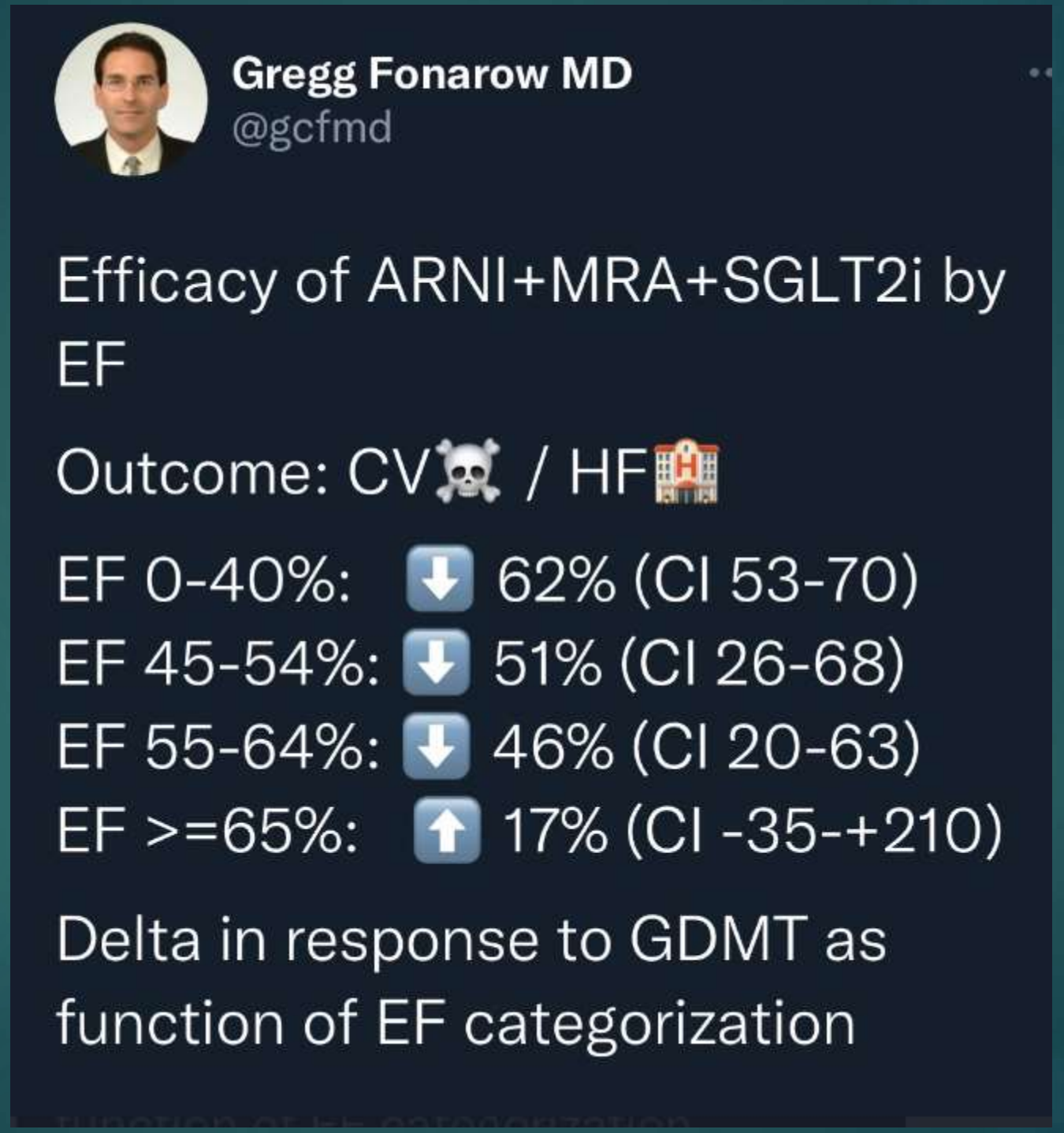
Sacubitril-valsartan (target dose, 97 mg of sacubitril with 103 mg of valsartan twice daily) or valsartan (target dose, 160 mg twice daily

Solomon SD, McMurray JJV, Anand IS, et al. N Engl J Med. 2019;381:1609–1620

CHAMP-HF Registry Data

- Only 1% of eligible patients were simultaneously treated with target ACEI/ARB/ARNI, beta-blocker, and MRA therapy
- <25% patients simultaneously received any dose of all 3 medications

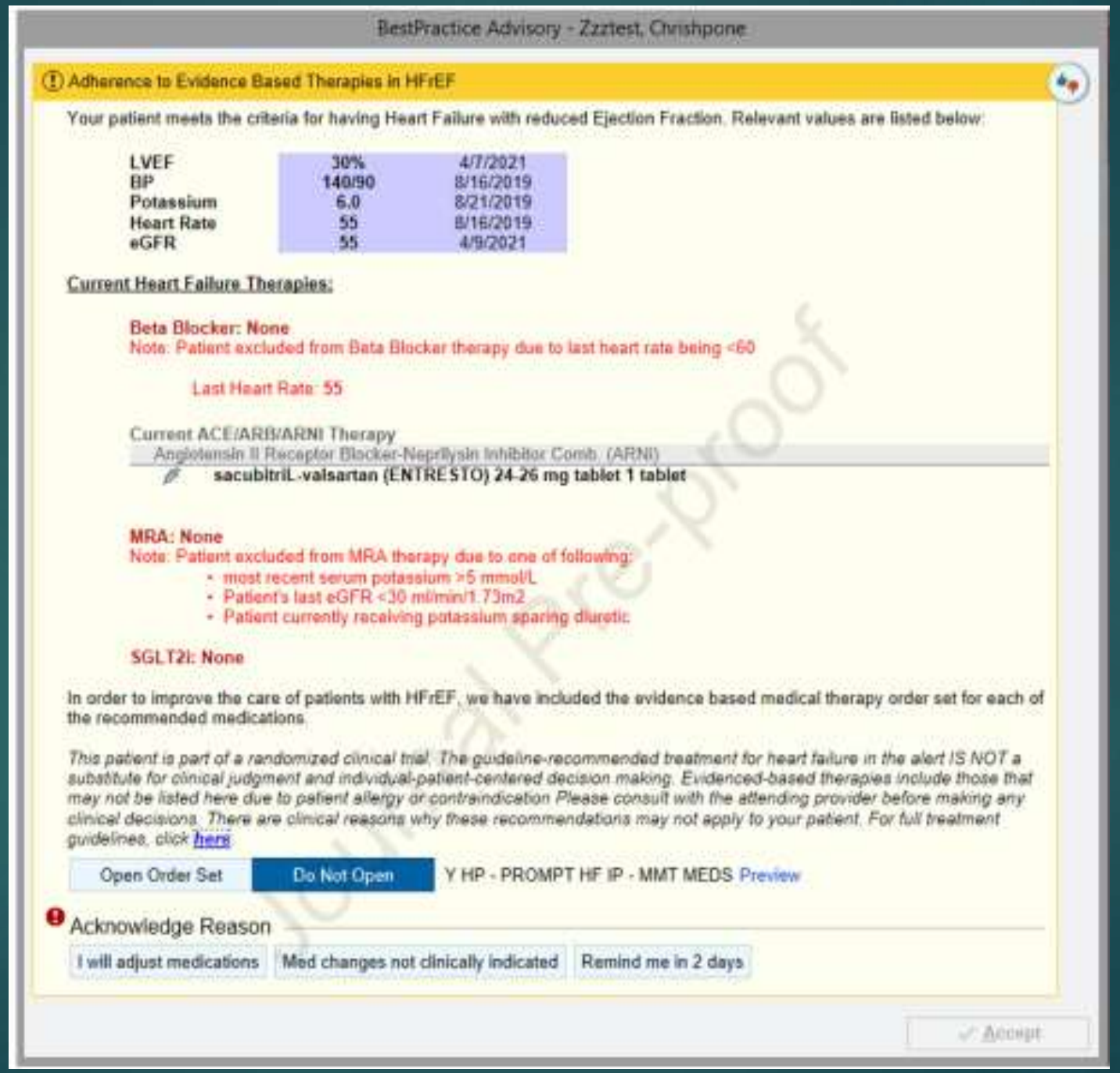
Greene, S.J. et al. J Am Coll Cardiol. 2018;72(4):351-66.



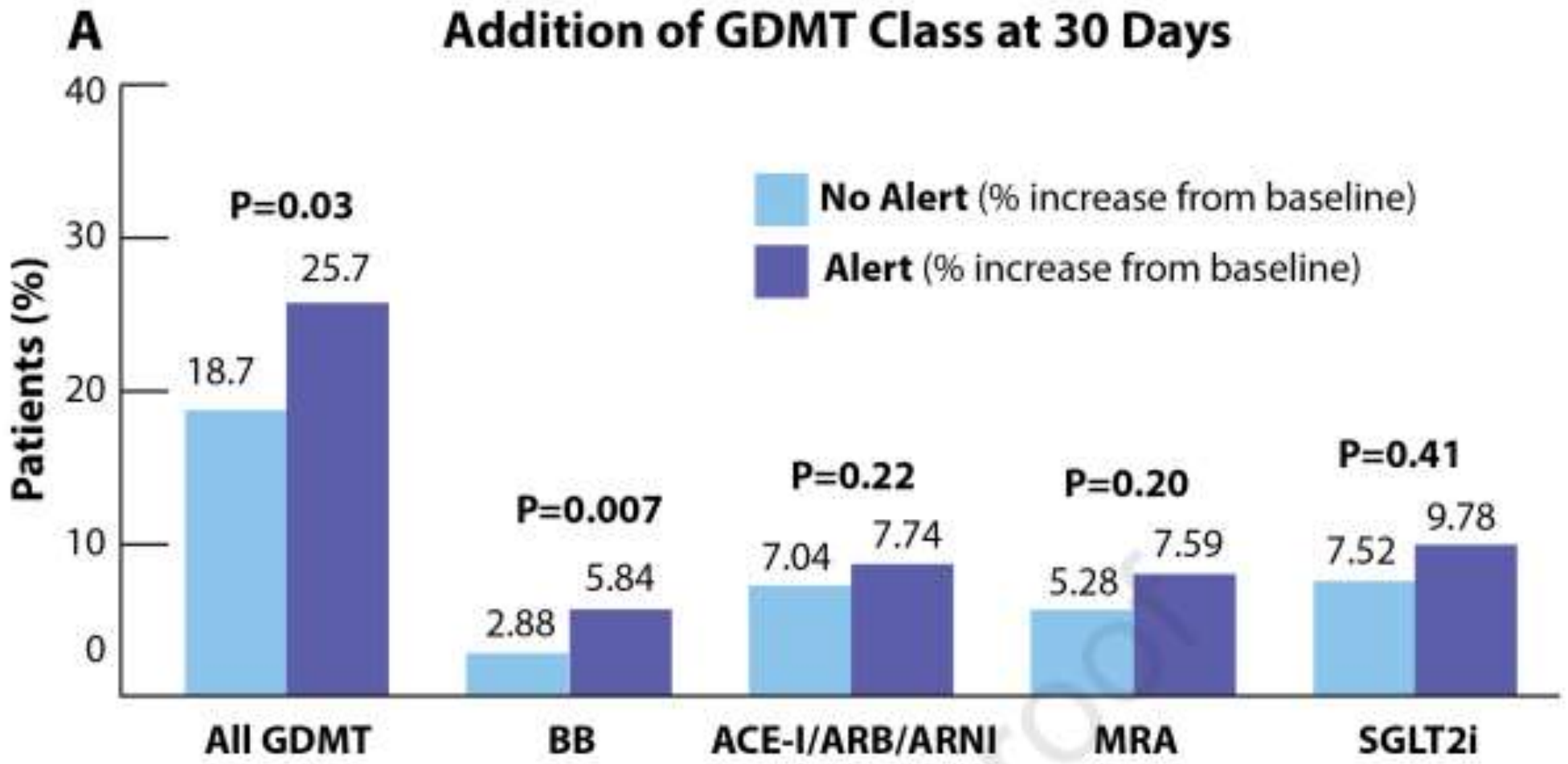
Vaduganathan Circulation. 2022 May 23. doi: 10.1161/CIRCULATIONAHA.121.058929.

A Cluster Randomized *PR*agmatic Trial Aimed At Impr*O*ving Use Of Guideline Directed *M*edical Therapy In Out*P*atien*T*s With *H*eart *F*ailure: *PROMPT-HF*

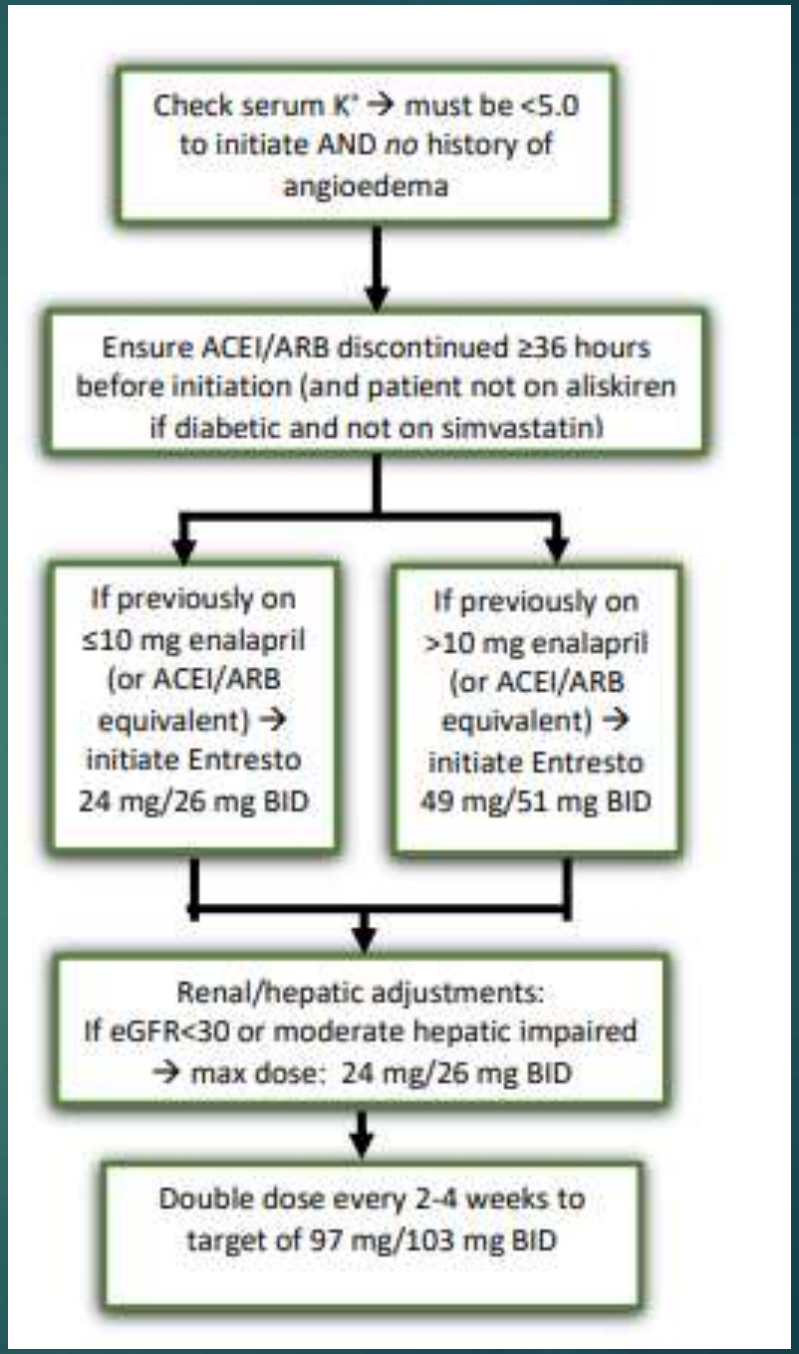
PROMPT-HF


BestPractice Advisory - Zzztest, Chrishpone
Adherence to Evidence Based Therapies in HFrEF
Your patient meets the criteria for having Heart Failure with reduced Ejection Fraction. Relevant values are listed below:
LVEF 30% 4/7/2021
BP 140/90 8/16/2019
Potassium 6.0 8/21/2019
Heart Rate 55 8/16/2019
eGFR 55 4/9/2021
Current Heart Failure Therapies:
Beta Blocker: None
Note: Patient excluded from Beta Blocker therapy due to last heart rate being <60
Last Heart Rate: 55
Current ACE/ARB/ARNI Therapy
Angiotensin II Receptor Blocker-Neprilysin Inhibitor Comb. (ARNI)
sacubitriL-valsartan (ENTRESTO) 24-26 mg tablet 1 tablet
MRA: None
Note: Patient excluded from MRA therapy due to one of following:
• most recent serum potassium >5 mmol/L
• Patient's last eGFR <30 ml/min/1.73m2
• Patient currently receiving potassium sparing diuretic
SGLT2i: None
In order to improve the care of patients with HFrEF, we have included the evidence based medical therapy order set for each of the recommended medications.
This patient is part of a randomized clinical trial. The guideline-recommended treatment for heart failure in the alert IS NOT a substitute for clinical judgment and individual-patient-centered decision making. Evidenced-based therapies include those that may not be listed here due to patient allergy or contraindication. Please consult with the attending provider before making any clinical decisions. There are clinical reasons why these recommendations may not apply to your patient. For full treatment guidelines, click here
Open Order Set
Do Not Open
Y HP - PROMPT HF IP - MMT MEDS Preview
Acknowledge Reason
I will adjust medications
Med changes not clinically indicated
Remind me in 2 days
Accept

- 100 providers randomized to either an alert or usual care.
- The primary outcome: an increase in the number of GDMT classes prescribed at 30 days post-randomization.
- 25% implemented the recommendations,
- 14% reported that patients weren't suitable candidates
- 49% postponed changes
- 12% ignored the alert


A
Addition of GDMT Class at 30 Days
Patients (%)
40
30
20
10
0
No Alert (% increase from baseline)
Alert (% increase from baseline)
P=0.03
18.7
25.7
P=0.007
2.88
5.84
P=0.22
7.04
7.74
P=0.20
5.28
7.59
P=0.41
7.52
9.78
All GDMT
BB
ACE-I/ARB/ARNI
MRA
SGLT2i

Sacubitril/Valsartan



Rosano Eur J HF 2021

2013

Class IIa

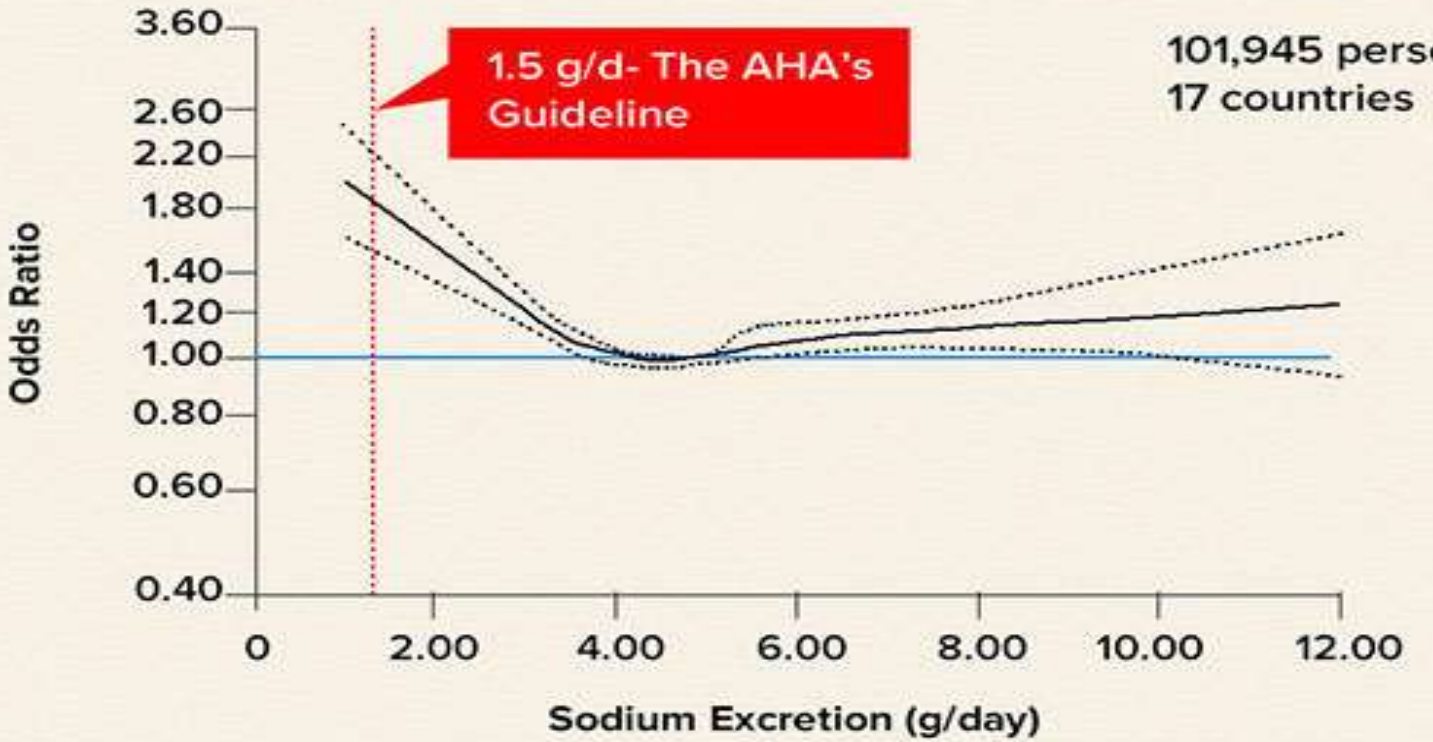
1. **Sodium restriction is reasonable for patients with symptomatic HF to reduce congestive symptoms. (*Level of Evidence: C*)**

2022

7.1.2. Dietary Sodium Restriction

Recommendation for Dietary Sodium Restriction		
COR	**LOE**	**Recommendation**
2a	**C-LD**	1. For patients with stage C HF, avoiding excessive sodium intake is reasonable to reduce congestive symptoms.[1–6]

Estimated Sodium Excretion and Risk of Death or Cardiovascular Events



No. of Events	101	1,023	1,437	597	126	25
No. at Risk	1817	30,124	46,663	18,395	3885	756

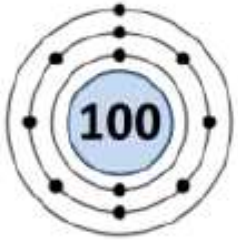
Medscape

Eric Topol modified from O'Donnell et al N Engl J Med. 2014;371:601-661

Canadian **VIGOUR** Centre
Bridging Hearts and Minds

Study of Dietary Intervention Under 100 MMOL in Heart Failure

SODIUM-HF



Justin A. Ezekowitz, MBBCh MSc, on behalf of the SODIUM-HF investigators

Professor, University of Alberta
Co-Director, Canadian VIGOUR Centre
Cardiologist, Mazankowski Alberta Heart Institute
ACC 2022

@sodiumhf

SODIUM-HF: Intervention

Patients randomized to one of two study arms:

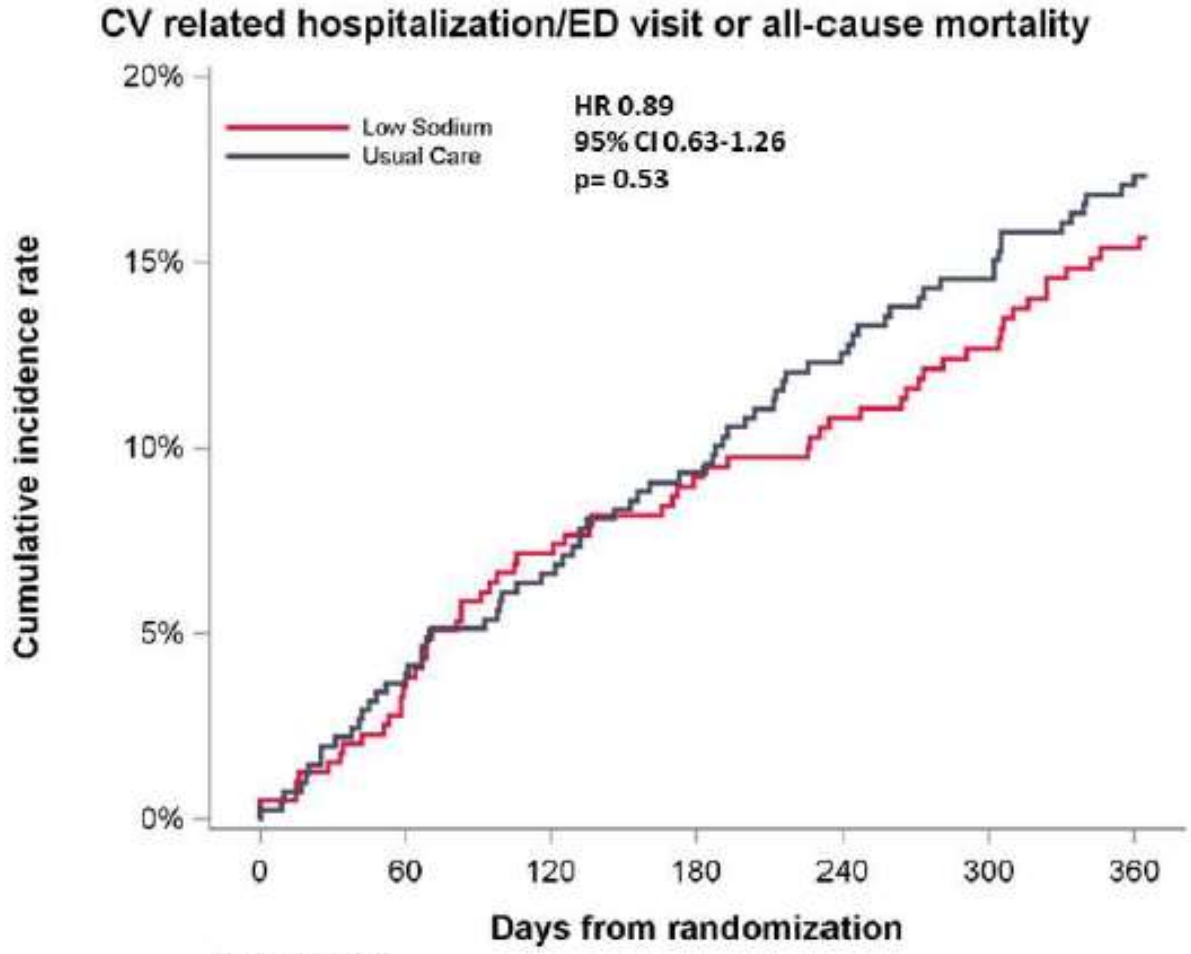
1. Low-sodium containing diet
    - <1500 mg daily (<65 mmol/daily)

2. Usual care
    - general advice to limit dietary sodium as provided in routine clinical practice

CIHR IRSC

University Hospital Foundation

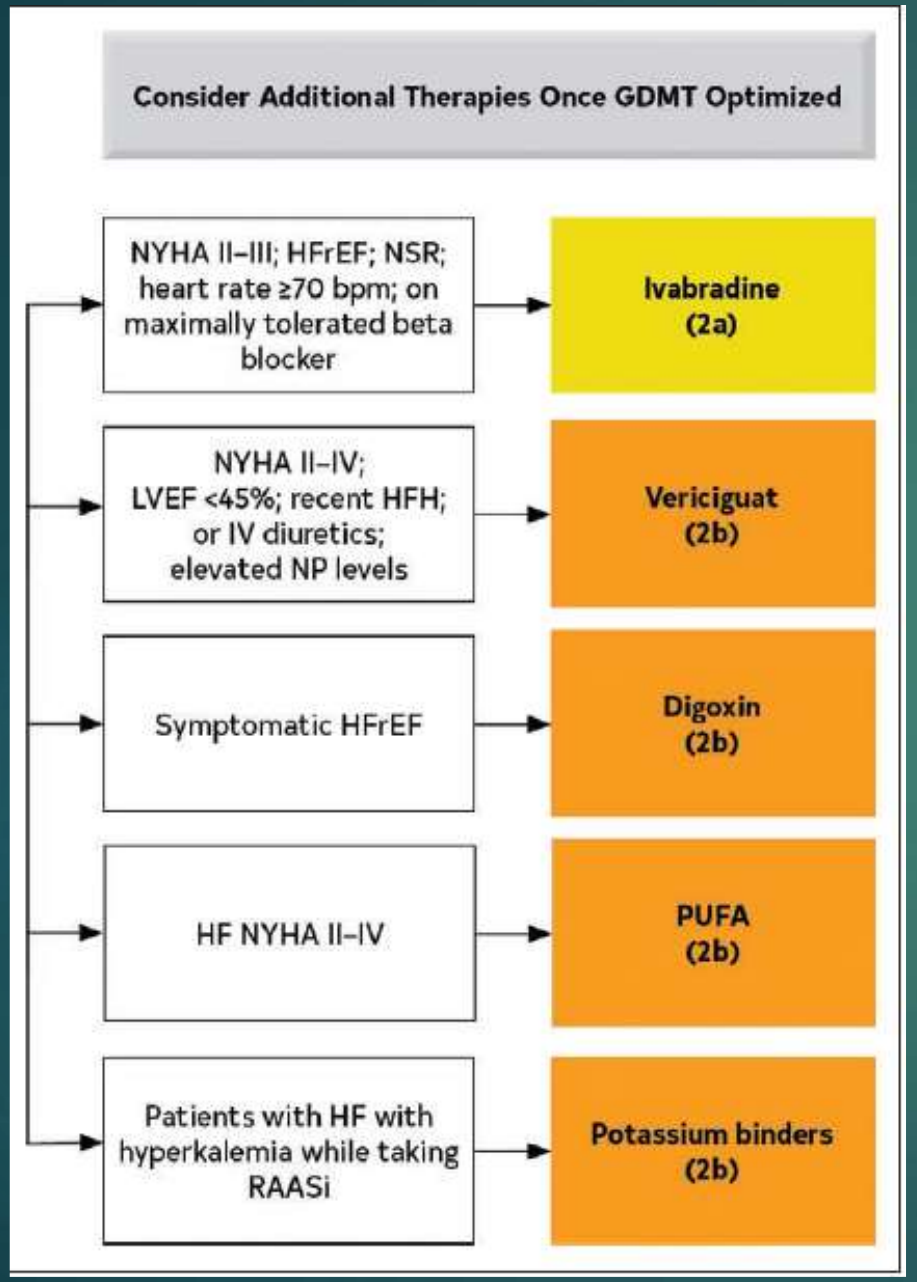
Primary Outcome



CIHR IRSC

University Hospital Foundation

SODIUM-HF

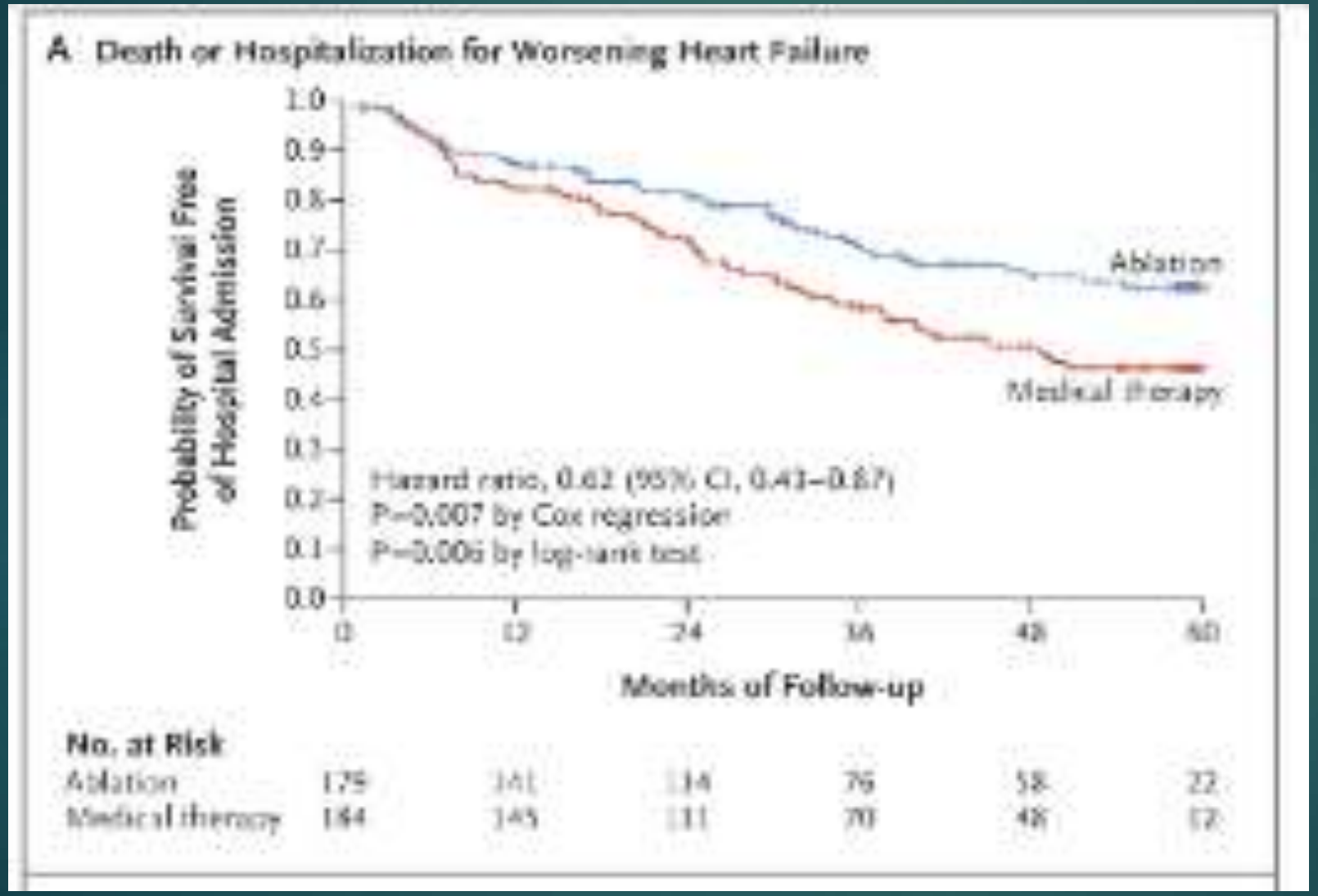


2b	B-R	1. In patients with HF class II to IV symptoms, omega-3 polyunsaturated fatty acid (PUFA) supplementation may be reasonable to use as adjunctive therapy to reduce mortality and cardiovascular hospitalizations.[1–4]
2b	B-R	2. In patients with HF who experience hyperkalemia (serum potassium level ≥5.5 mEq/L) while taking a renin-angiotensin-aldosterone system inhibitor (RAASi), the effectiveness of potassium binders (patiromer, sodium zirconium cyclosilicate) to improve outcomes by facilitating continuation of RAASi therapy is uncertain.[5,6]

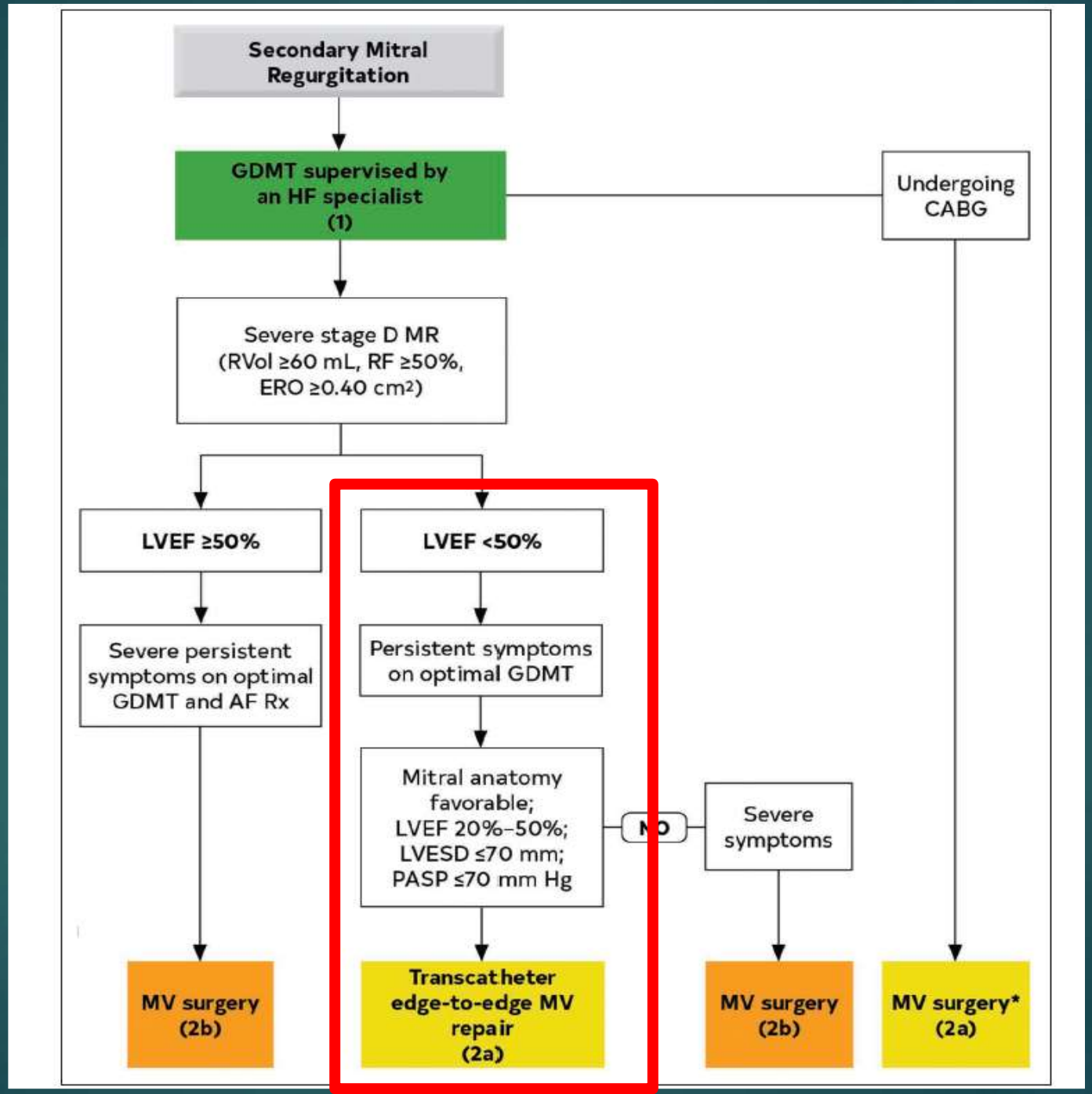
10.2. Management of AF in HF

Recommendations for Management of AF in HF Referenced studies that support the recommendations are summarized in the Online Data Supplements		
COR	LOE	Recommendations
1	A	1. Patients with chronic HF with permanent-persistent-paroxysmal AF and a CHA_2DS_2-VASc score of ≥2 (for men) and ≥3 (for women) should receive chronic anticoagulant therapy.[1–8]
1	A	2. For patients with chronic HF with permanent-persistent-paroxysmal AF, DOAC is recom-
2a	B-R	3. For patients with HF and symptoms caused by AF, AF ablation is reasonable to improve symptoms and QOL.[11–14]
2a	B-R	4. For patients with AF and LVEF ≤50%, if a rhythm control strategy fails or is not desired, and ventricular rates remain rapid despite medical therapy, atrioventricular nodal ablation with implantation of a CRT device is reasonable.[15–22]
2a	B-NR	5. For patients with chronic HF and permanent-persistent-paroxysmal AF, chronic anticoagulant therapy is reasonable for men and women without additional risk factors.[23–26]

CASTLE

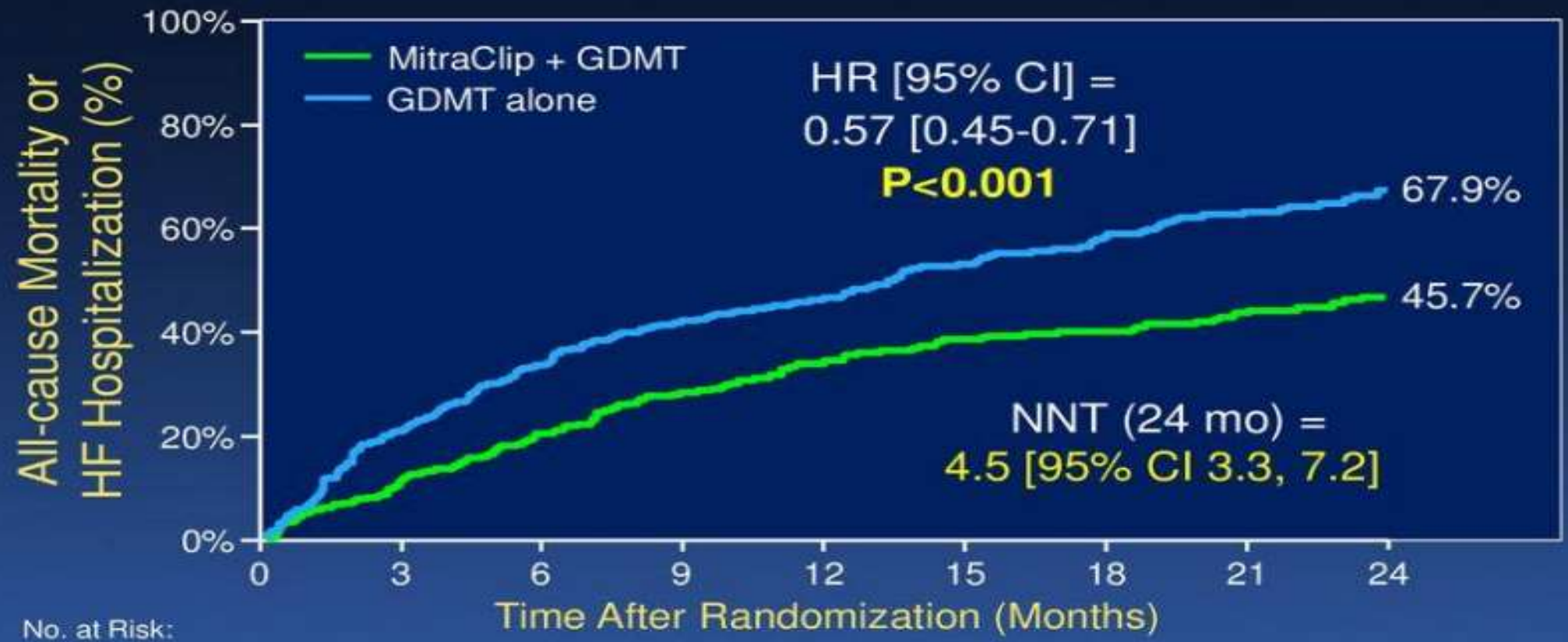


Marrouche NEJM 2028


Secondary Mitral Regurgitation
GDMT supervised by an HF specialist (1)
Undergoing CABG
Severe stage D MR (RVol ≥60 mL, RF ≥50%, ERO ≥0.40 cm²)
LVEF ≥50%
LVEF <50%
Severe persistent symptoms on optimal GDMT and AF Rx
Persistent symptoms on optimal GDMT
Mitral anatomy favorable; LVEF 20%–50%; LVESD ≤70 mm; PASP ≤70 mm Hg
NO
Severe symptoms
MV surgery (2b)
Transcatheter edge-to-edge MV repair (2a)
MV surgery (2b)
MV surgery* (2a)

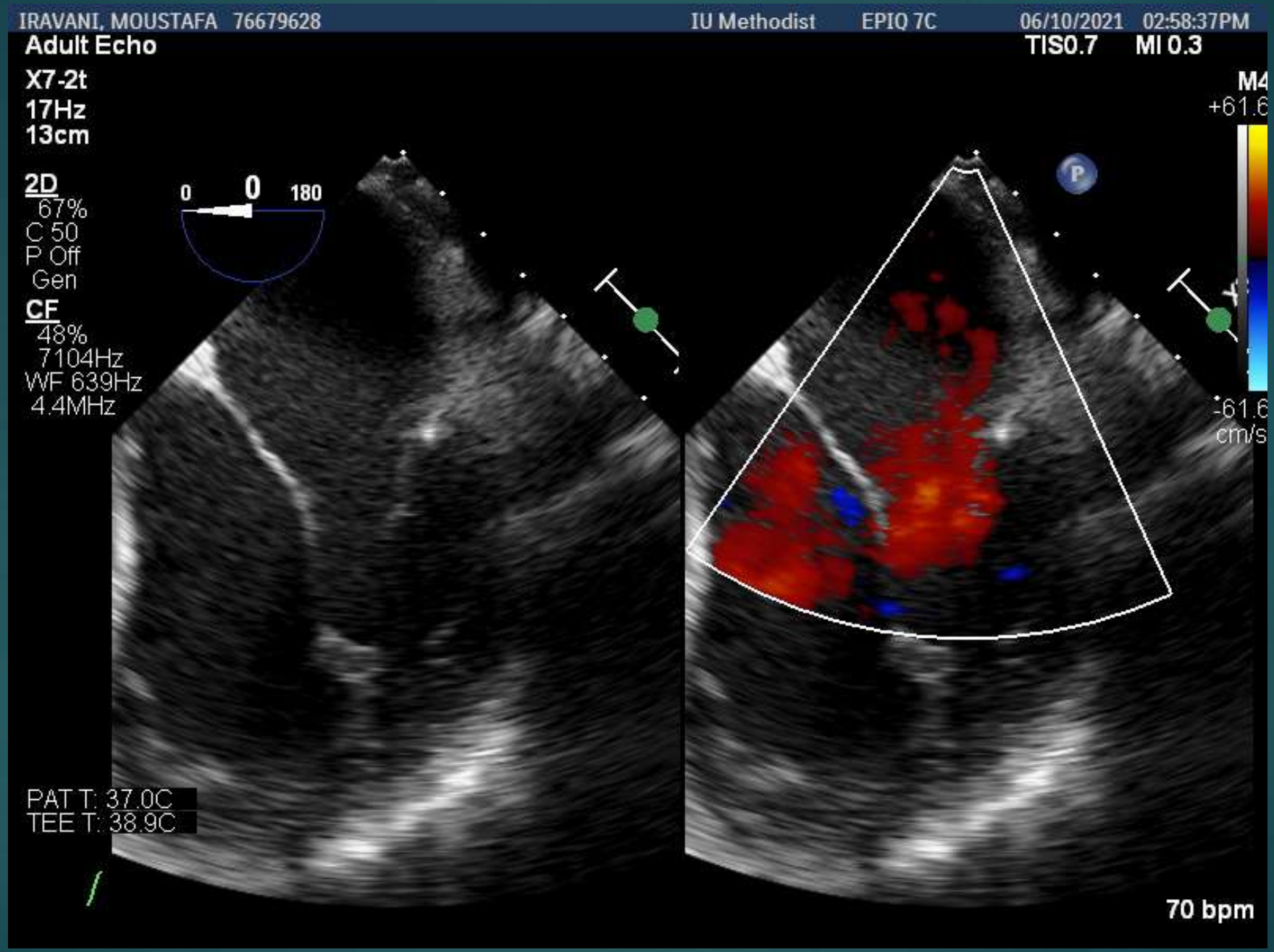
COAPT TRIAL

Death or HF Hospitalization



No. at Risk:

MitraClip + GDMT	302	264	238	215	194	154	145	126	97
GDMT alone	312	244	205	174	153	117	90	75	55


IRAVANI, MOUSTAFA 76679628
IU Methodist
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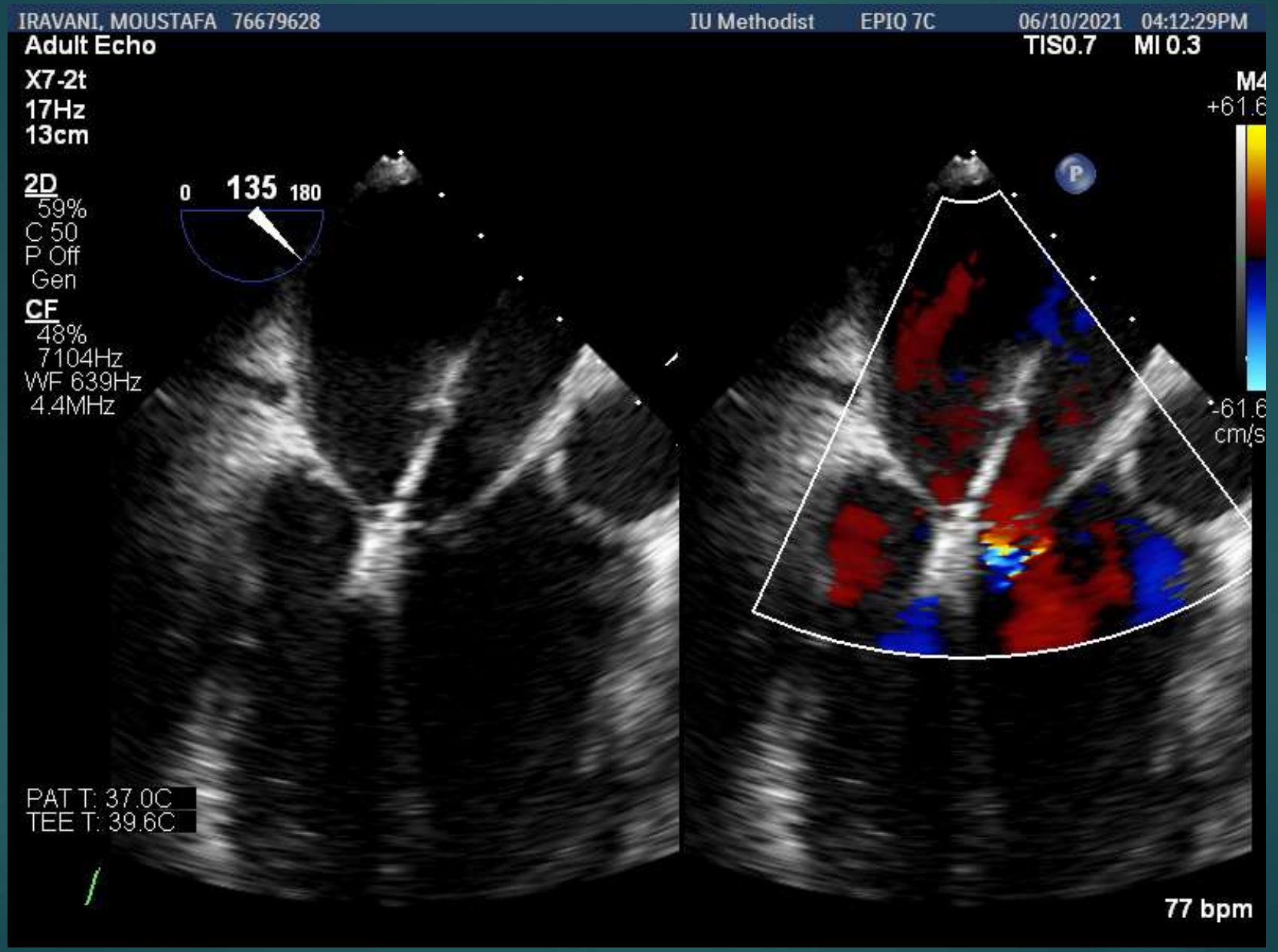
Adult Echo
TIS0.7 MI 0.3
X7-2t
17Hz
13cm
2D
67%
C 50
P Off
Gen
CF
48%
7104Hz
WF 639Hz
4.4MHz
0 0 180
M4
+61.6
-61.6
cm/s
PAT T: 37.0C
TEE T: 38.9C
70 bpm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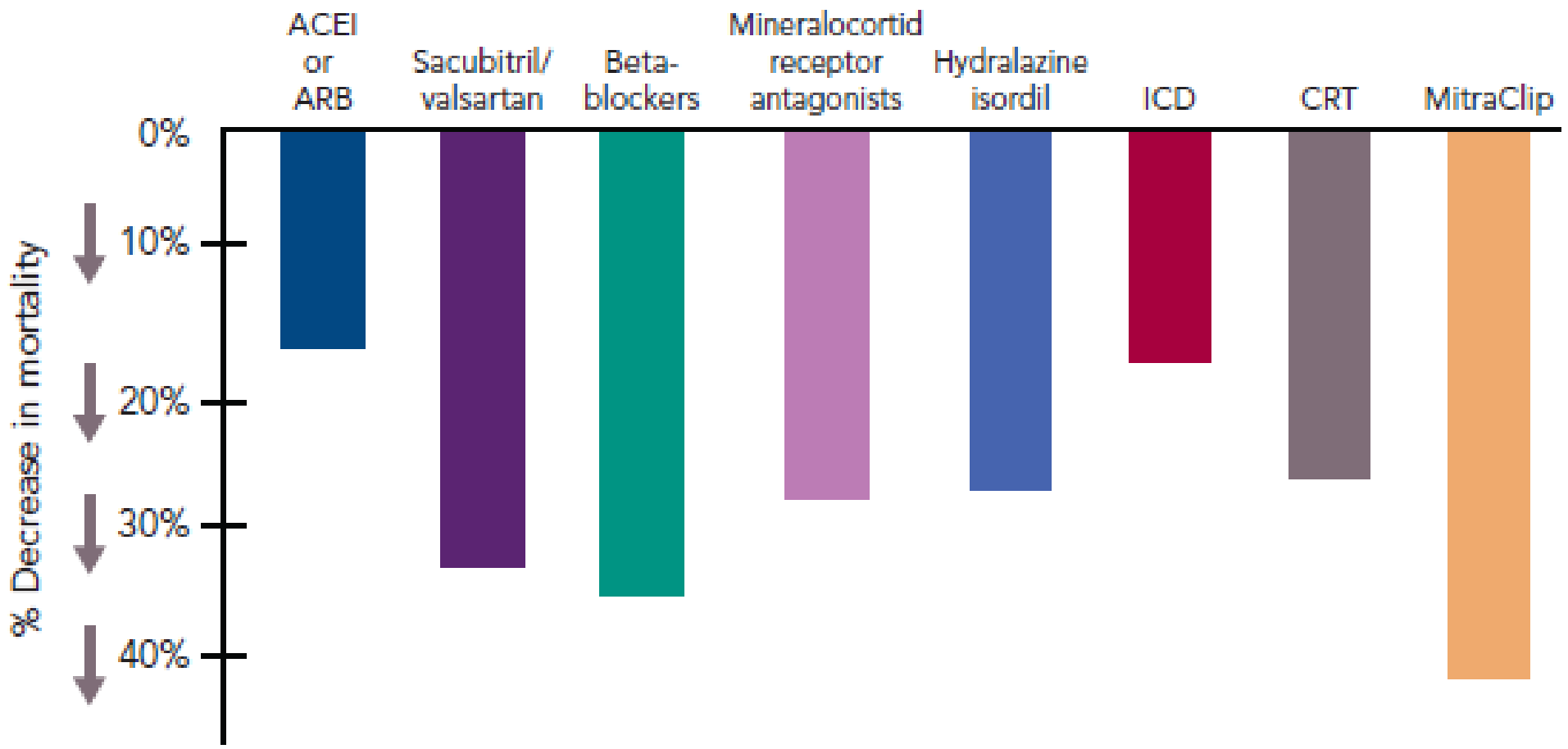
Adult Echo
TIS0.7 MI 0.3
X7-2t
17Hz
13cm
2D
59%
C 50
P Off
Gen
CF
48%
7104Hz
WF 639Hz
4.4MHz
0 135 180
M4
+61.6
-61.6
cm/s
PAT T: 37.0C
TEE T: 39.6C
77 bpm

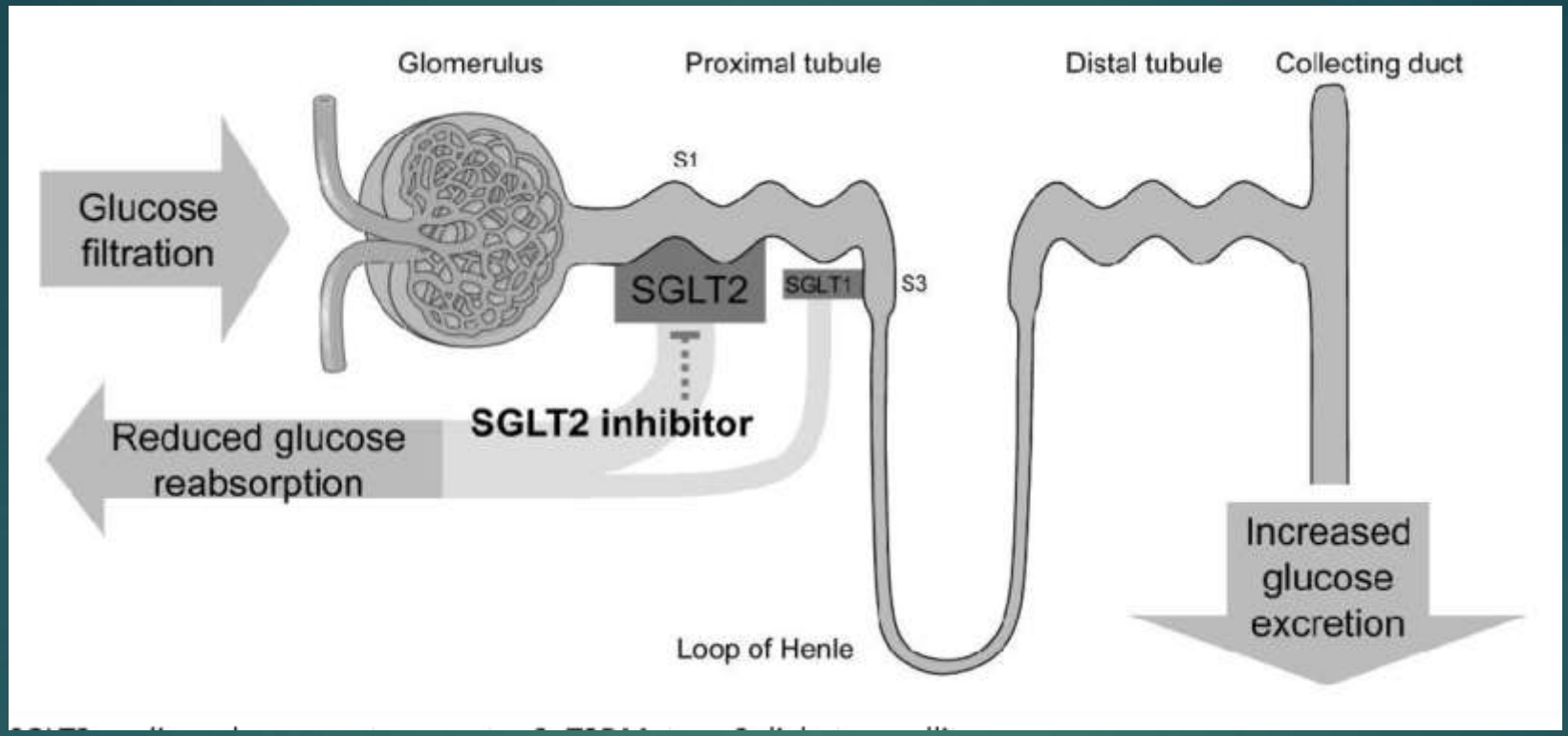
Mortality reduction in Heart Failure



Conclusions

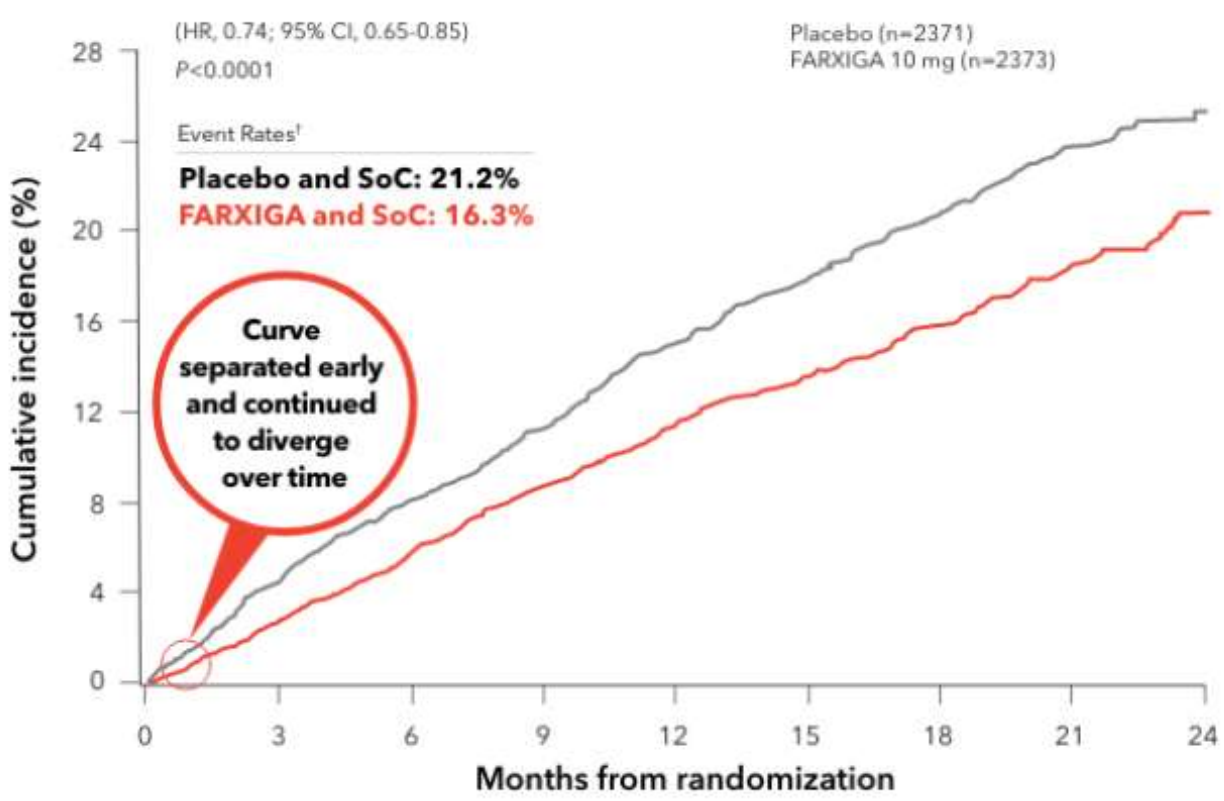
- Recovered LVEF: continue GDMT
- ARNI→ACE→ARBs
- SGLT2 inhibitors – any LVEF
- Afib: rhythm control
- Severe MR: consider mitraclip

T



SGLT2 inhibitors- Inhibit 30-50% of Renal Glucose Absorption

Primary end point: Composite of CV death or hospitalization for heart failure[1,2,*]



↓ 26% RRR

4.9% ARR

NNT=21

DAPA-HF

NYHA class II,III,IV

EF <40%

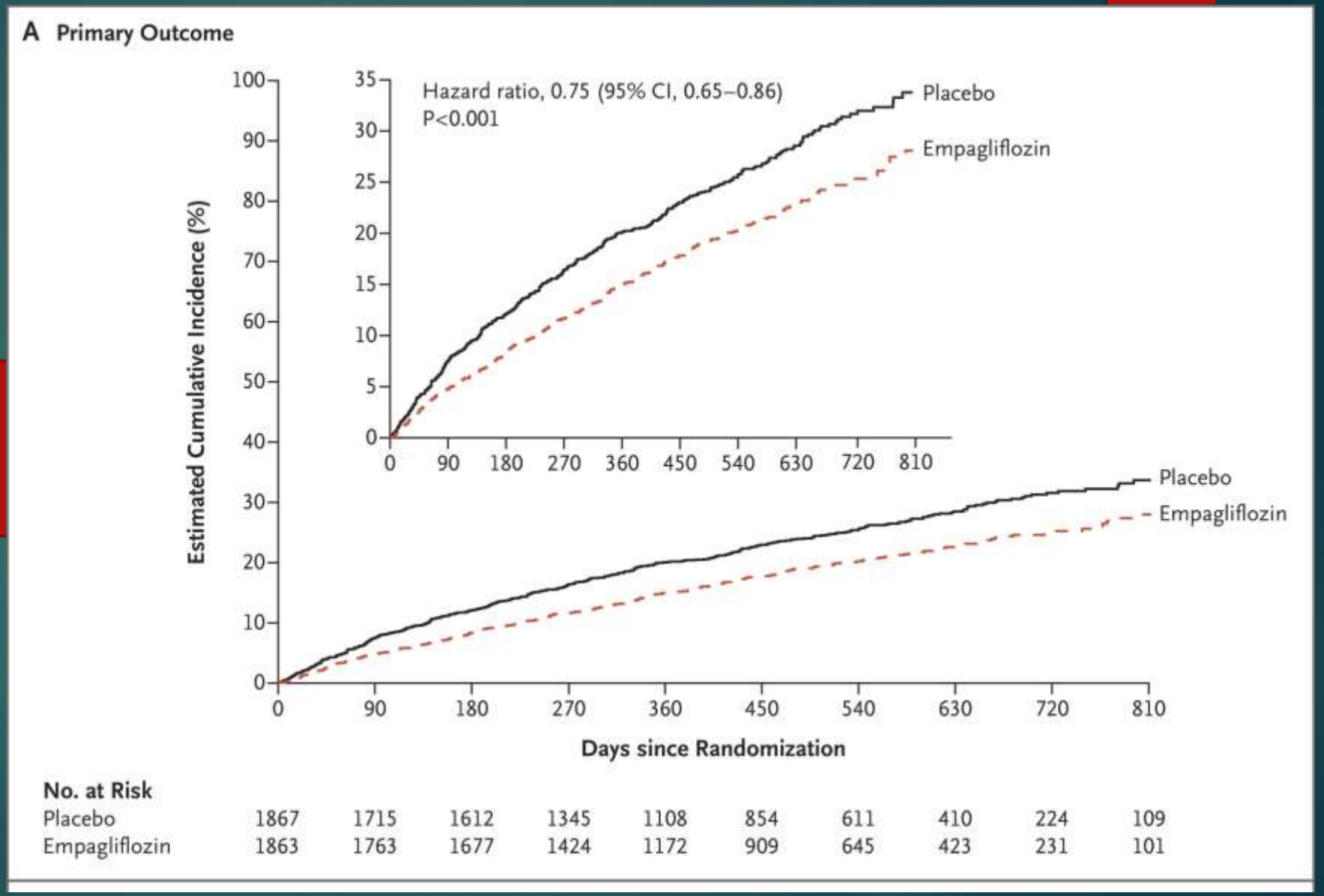
With or without Diabetes

CV death	Hospitalization for heart failure
↓ 18% RRR	↓ 30% RRR
P=0.0294	*P*<0.0001
(HR, 0.82; 95% CI, 0.69-0.98)	(HR, 0.70; 95% CI, 0.59-0.83)
1.9% ARR†	3.7% ARR†

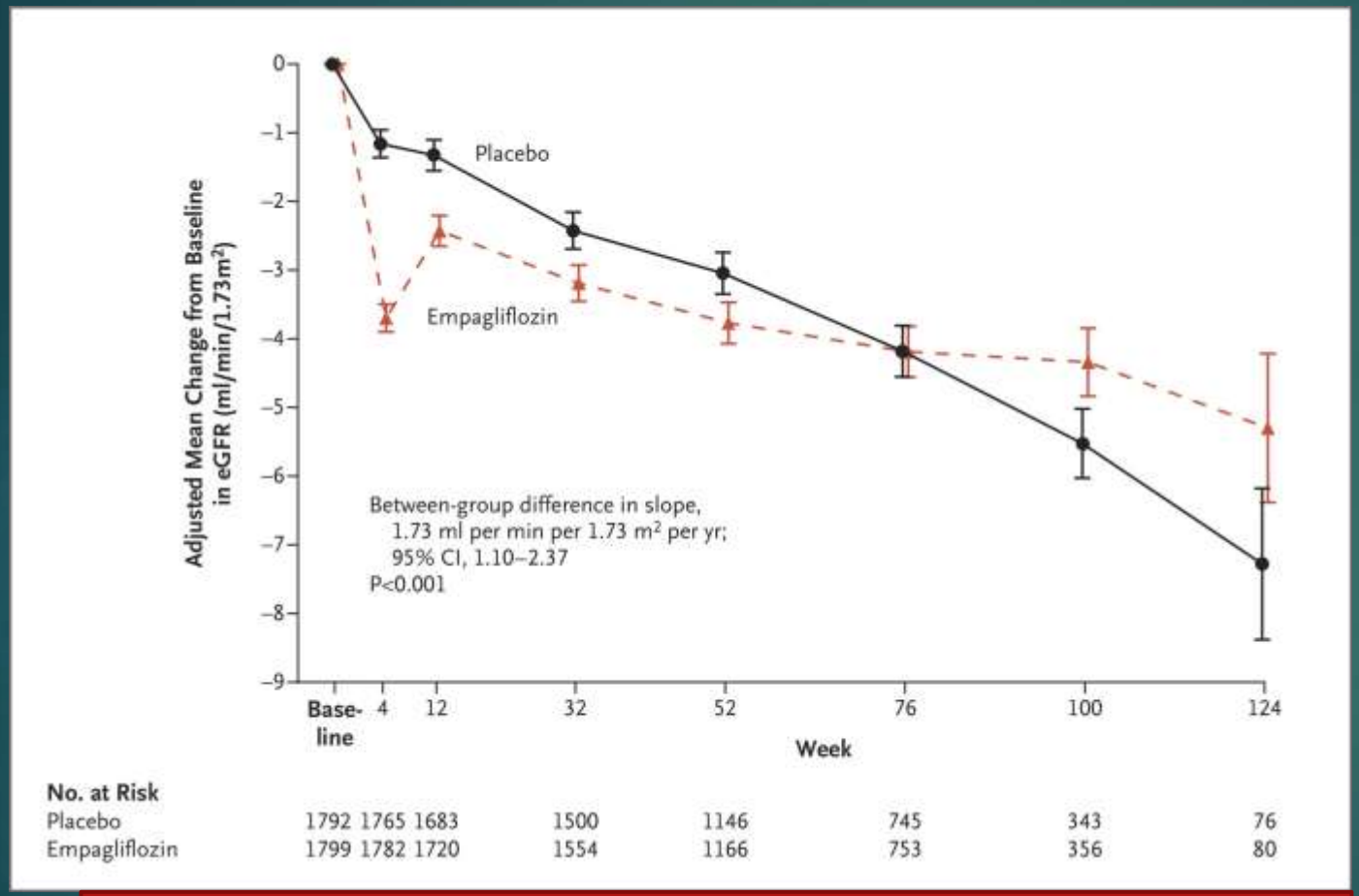
EMPEROR Reduced

Empagliflozin

3700 patients
NYHA II,III,IV
EF <40%



EMPEROR- Reduced- Renal benefits
Slower decline in GFR in SGLT 2 inhibitor group



Secondary outcome

Decline in GFR -0.55 vs- 2.28ml/1.73 body surface area/year

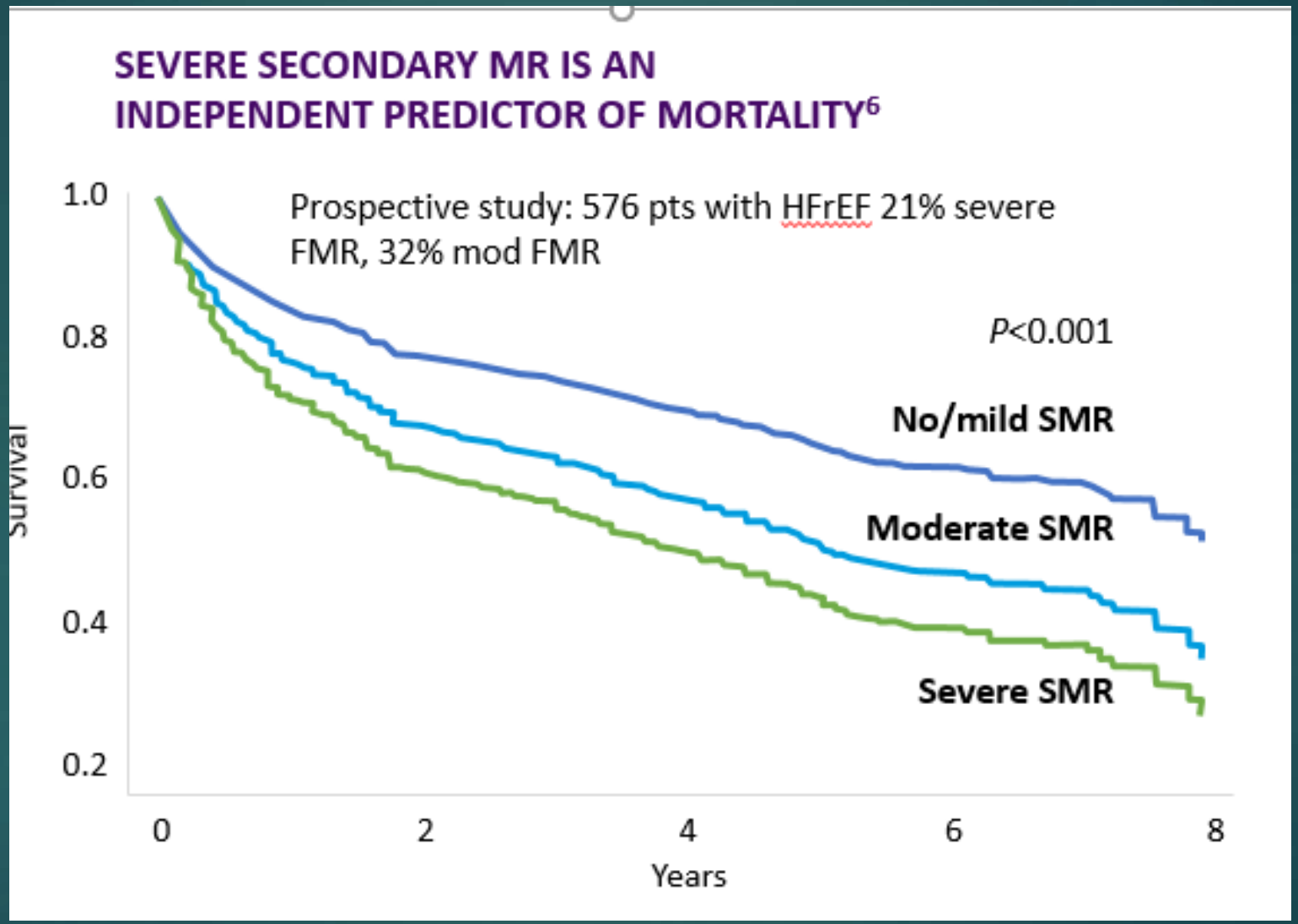
50% Decrease in Renal Events

p<0.001

Diastolic Heart Failure and SGLT2 inhibitors

- EMPEROR –Preserved
- Deliver

SEVERE SECONDARY MR IS AN INDEPENDENT PREDICTOR OF MORTALITY[6]



Jung B, et al. *Eur Heart J*. 2003;24:1231-1243.

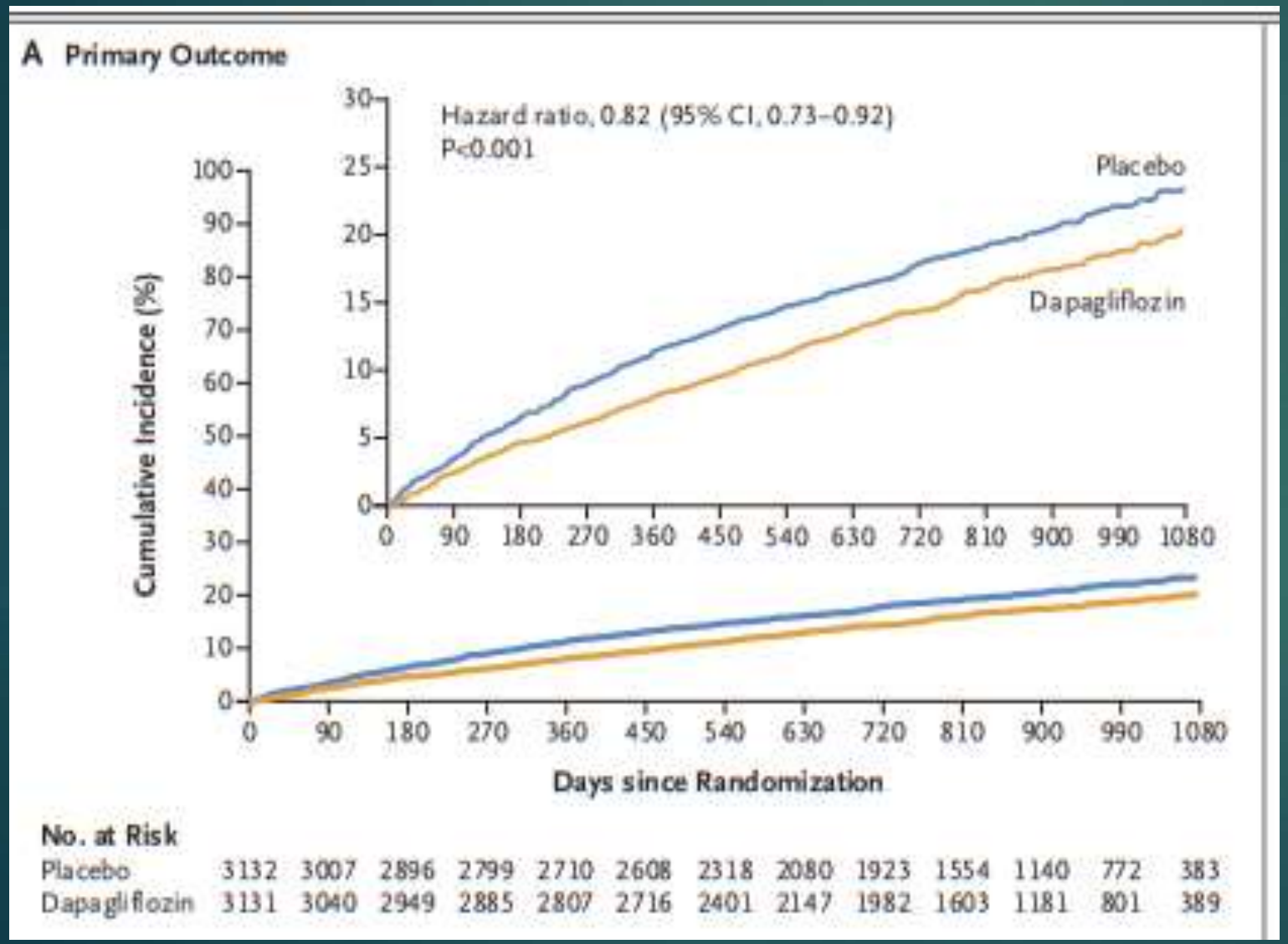
Diastolic Heart Failure and SGLT2 inhibitors

- EMPEROR –Preserved
- Deliver

FIGURE 5 The MitraClip Device

Close-up views of the MitraClip device's fabric-covered clip **(left)** and guiding catheter with clip delivery system **(right)**. Images courtesy of Abbott Vascular, Menlo Park, California.

DELIVER: Dapagliflozin



EF>40%
had evidence of structural heart disease; and had an elevated natriuretic peptide level

Worsening HF or CV death

Solomon NEJM 2022

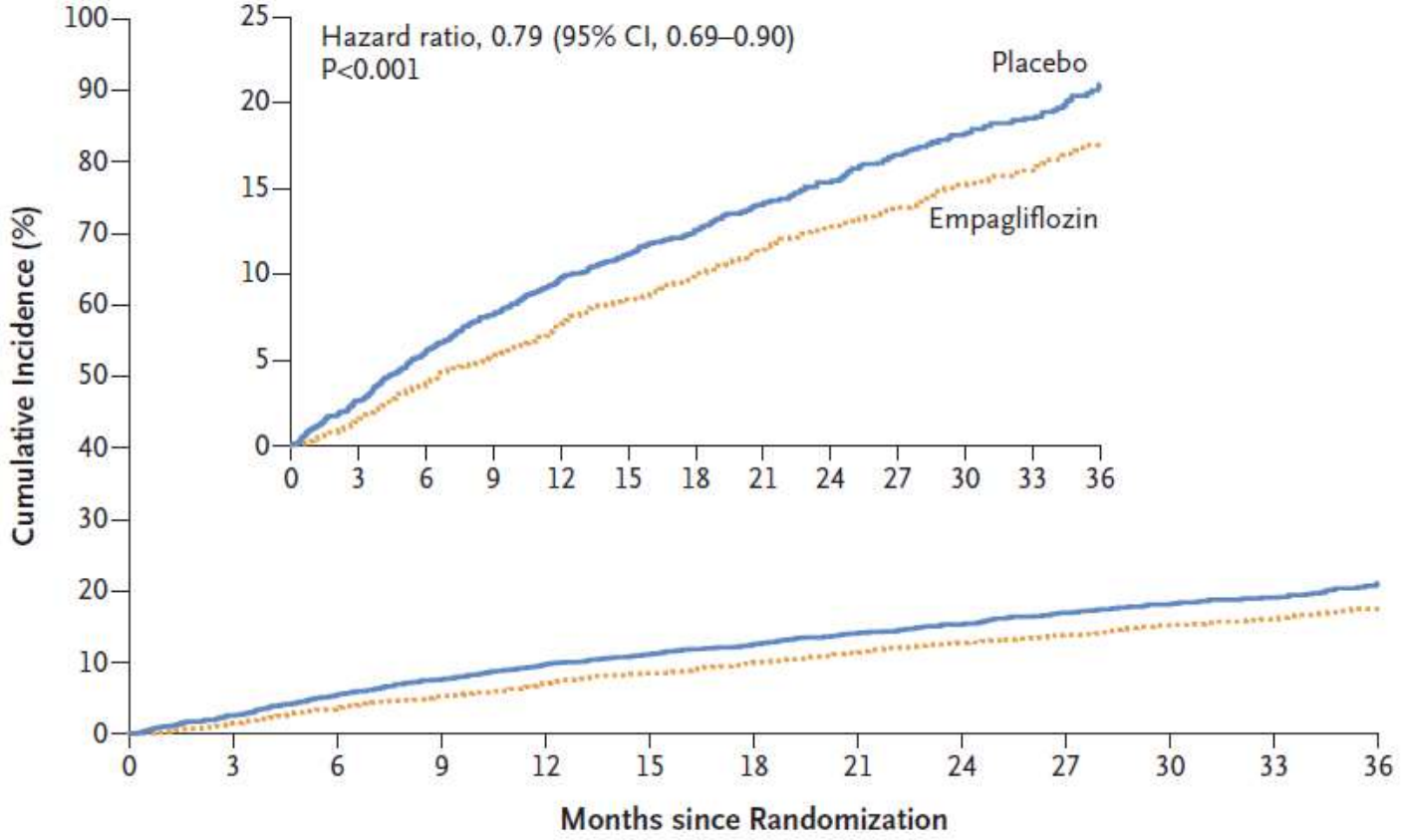
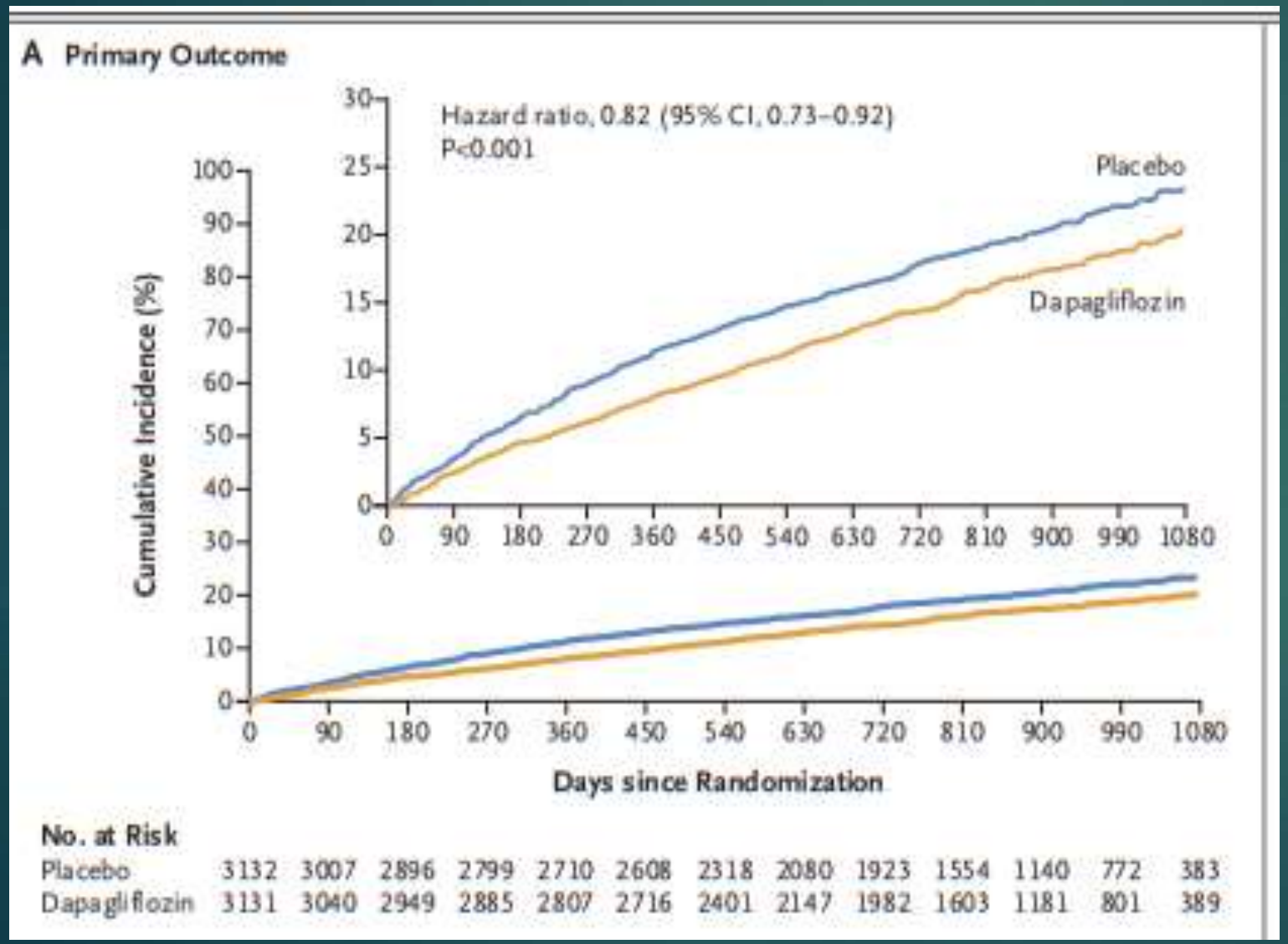


Figure 1. Primary Outcome, a Composite of Cardiovascular Death or Hospitalization for Heart Failure.
The estimated cumulative incidence of the primary outcome in the two groups is shown. The inset shows the data on an expanded y axis.

Anker et al EMPEROR-preserved

EF >40%
NYHA class II,III,IV
LAE or LVH
BMI <45
Stable diuretic dose

DELIVER: Dapagliflozin



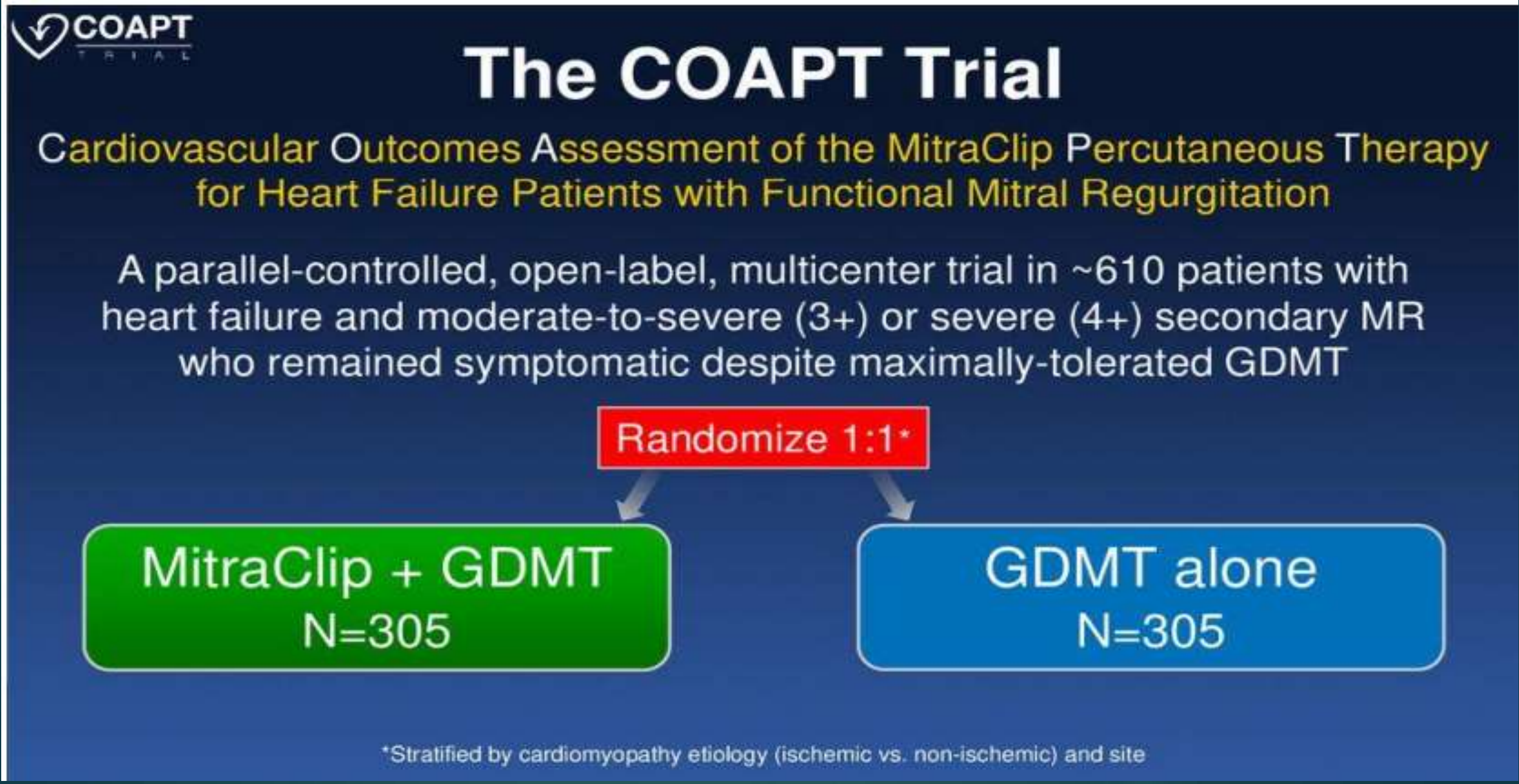
EF>40%
had evidence of structural heart disease; and had an elevated natriuretic peptide level

Worsening HF or CV death

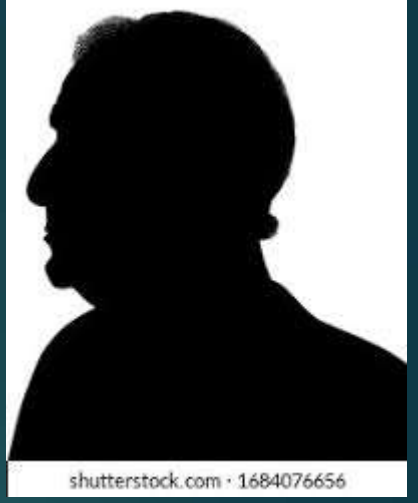
Solomon NEJM 2022

63 year old male

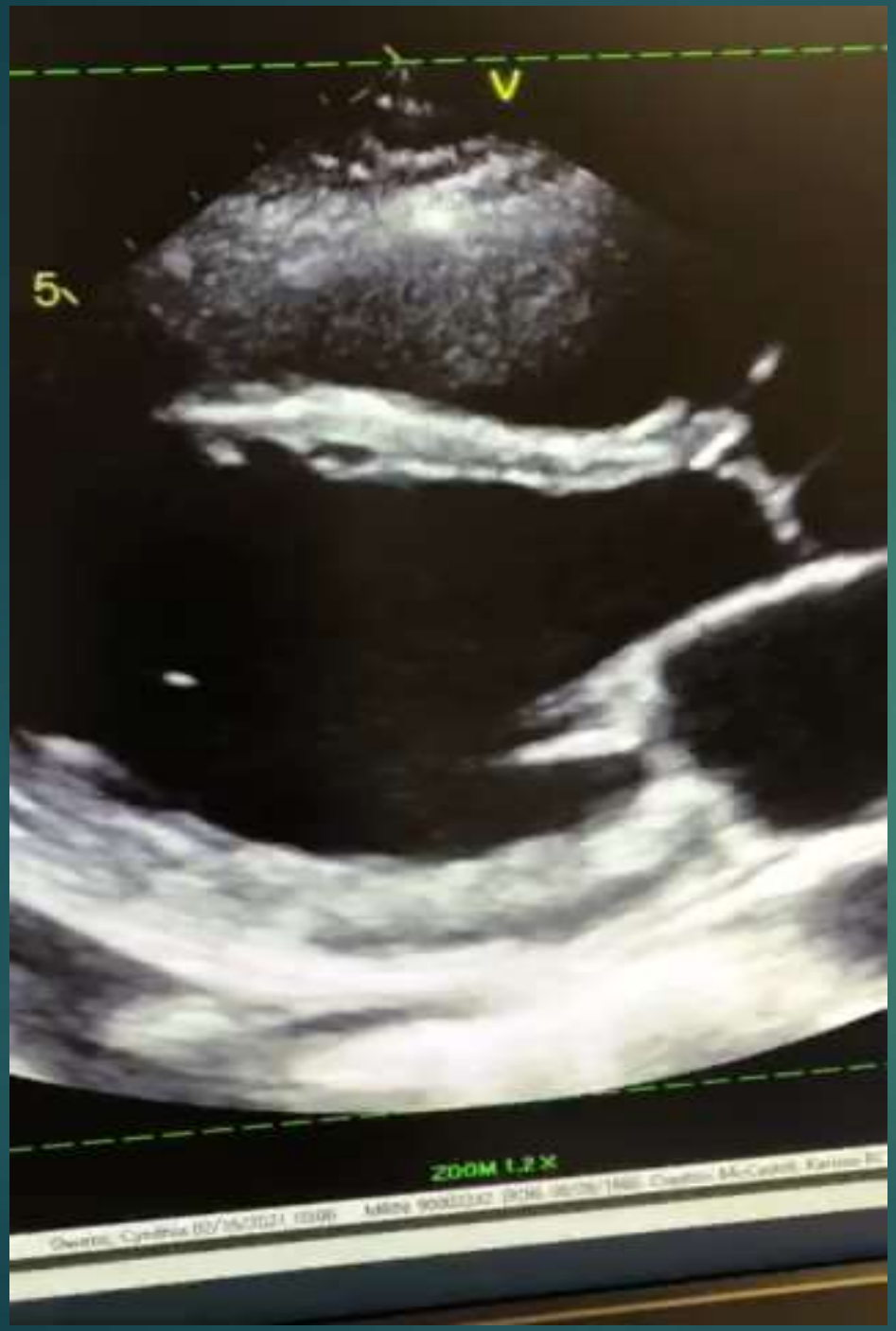
- Presented with severe chest pain
- Anterior MI
- 100% LAD occlusion, moderate RCA disease and severe Cx disease
- Referred for CABG, declined, multiple stents
- LVEF 20%, moderate MR
- VT storm, ablation, ICD implanted

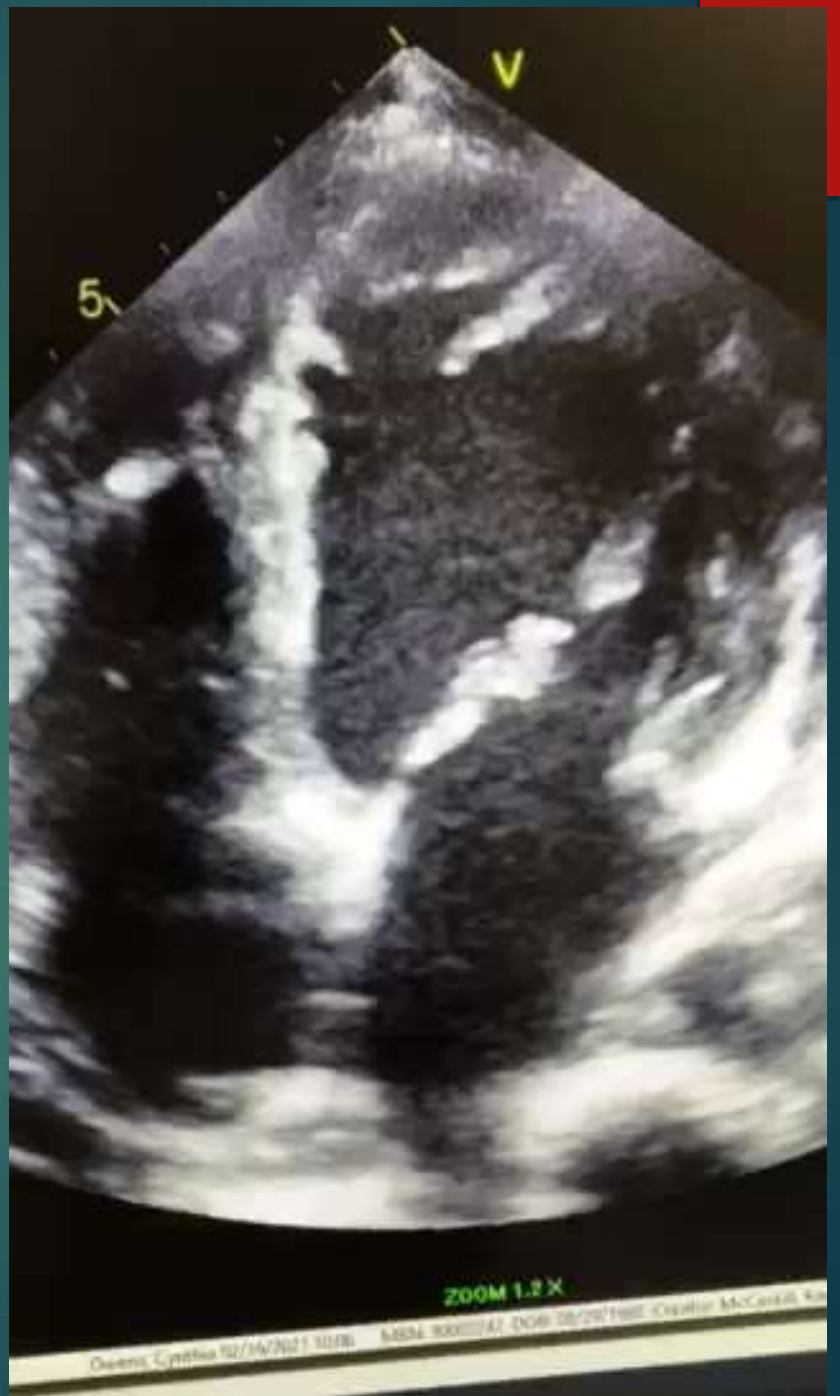

COAPT
TRIAL
The COAPT Trial
Cardiovascular Outcomes Assessment of the MitraClip Percutaneous Therapy for Heart Failure Patients with Functional Mitral Regurgitation
A parallel-controlled, open-label, multicenter trial in ~610 patients with heart failure and moderate-to-severe (3+) or severe (4+) secondary MR who remained symptomatic despite maximally-tolerated GDMT
Randomize 1:1*
MitraClip + GDMT
N=305
GDMT alone
N=305
*Stratified by cardiomyopathy etiology (ischemic vs. non-ischemic) and site

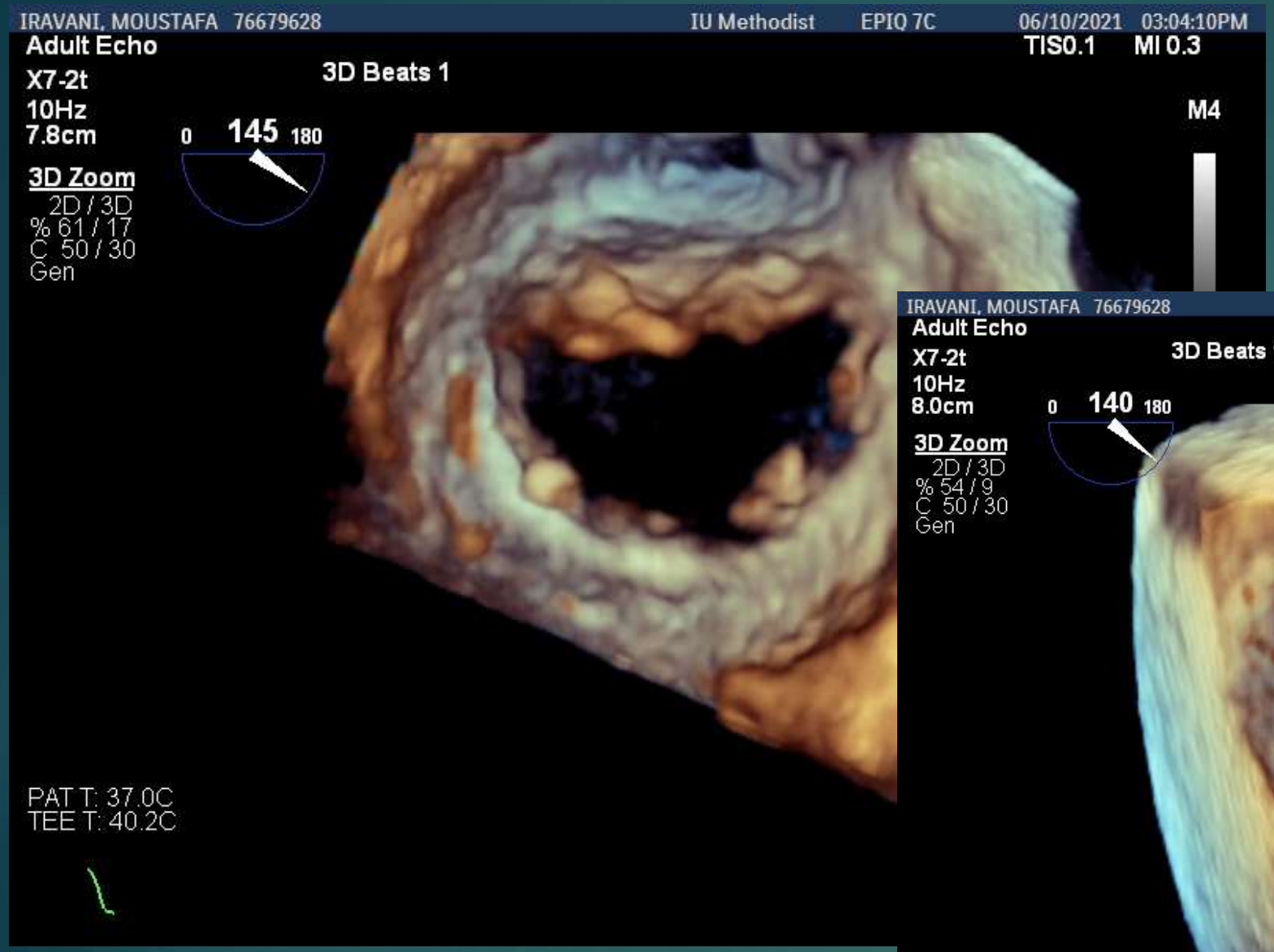
Multiple admissions for syncope/falls/shortness of breath



1	B-R	4. For patients who have LVEF ≤35%, sinus rhythm, left bundle branch block (LBBB) with a QRS duration ≥150 ms, and NYHA class II, III, or ambulatory IV symptoms on GDMT, CRT is indicated to reduce total mortality, reduce hospitalizations, and improve symptoms and QOL.[16–21]


V
5
ZOOM 1.2 X


V
5
ZOOM 1.2 X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IU Methodist
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Adult Echo
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X7-2t
3D Beats 1
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IRAVANI, MOUSTAFA 76679628
IU Methodist
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Adult Echo
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% 54 / 9
C 50 / 30
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PAT T: 37.0C
TEE T: 39.8C
76 bpm