



«Διαστολική» / «Συστολική» ΚΑ
Πρόγραμμα Μεταπτυχιακών Σπουδών

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Γ' Πανεπιστημιακή Καρδιολογική Κλινική, Γ.Ν.Ν.Θ.Α «Η Σωτηρία»

Definition of heart failure

abnormality of cardiac structure or function

leading to

failure of the heart to deliver oxygen at a rate
commensurate with the requirements of the
metabolizing tissues

(or only at the expense of increased filling pressures)

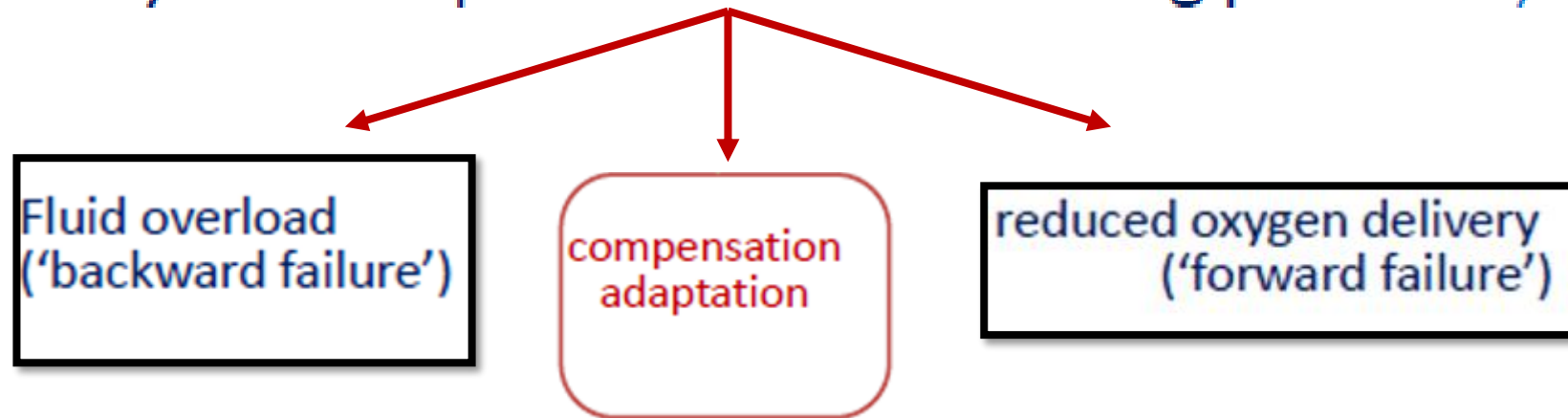


Table 6 Symptoms and signs typical of heart failure

Symptoms	Signs
Typical	More specific
Breathlessness	Elevated jugular venous pressure
Orthopnoea	Hepatojugular reflux
Paroxysmal nocturnal dyspnoea	Third heart sound (gallop rhythm)
Reduced exercise tolerance	Laterally displaced apical impulse
Fatigue, tiredness, increased time to recover after exercise	
Ankle swelling	
Less typical	Less specific
Nocturnal cough	Weight gain (>2 kg/week)
Wheezing	Weight loss (in advanced HF)
Bloated feeling	Tissue wasting (cachexia)
Loss of appetite	Cardiac murmur
Confusion (especially in the elderly)	Peripheral oedema (ankle, sacral, scrotal)
Depression	Pulmonary crepitations
Palpitation	Pleural effusion
Dizziness	Tachycardia
Syncope	Irregular pulse
Bendopnea ^a	Tachypnoea
	Cheyne-Stokes respiration
	Hepatomegaly
	Ascites
	Cold extremities
	Oliguria
	Narrow pulse pressure

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HF = heart failure.

^aThis symptom of advanced HF corresponds to shortness of breath when leaning forward.⁶⁷

Ορολογία Καρδιακής Ανεπάρκειας

1) Κατάταξη ΚΑ σύμφωνα με τη Συστολική λειτουργία της Αριστεράς Κοιλίας και το ΚΕ

2) Κατάταξη ΚΑ σύμφωνα με τη Βαρύτητα

NYHA

Stages A, B, C, D

Killip Class

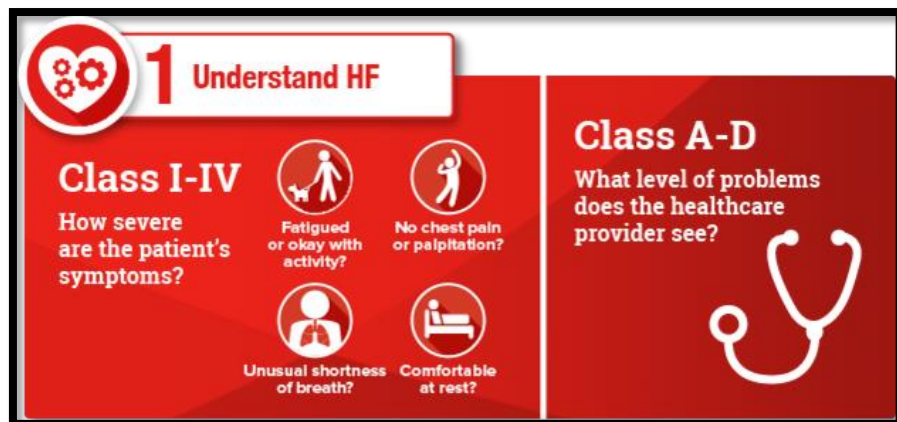
«Προχωρημένη» (severe symptoms, recurrent decompensation and severe cardiac dysfunction)

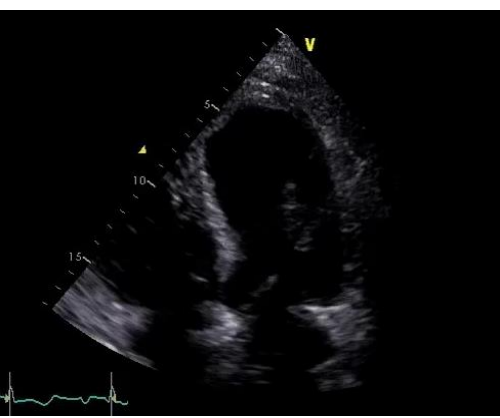
3) Ανάλογα με το χρόνο/τρόπο εμφάνισης

Οξεία

Χρόνια

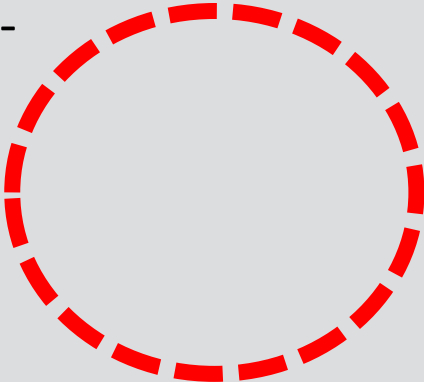
Διάγνωση
Και
Αντιμετώπιση





Definition of heart failure with reduced ejection fraction, mildly reduced ejection fraction and preserved ejection fraction

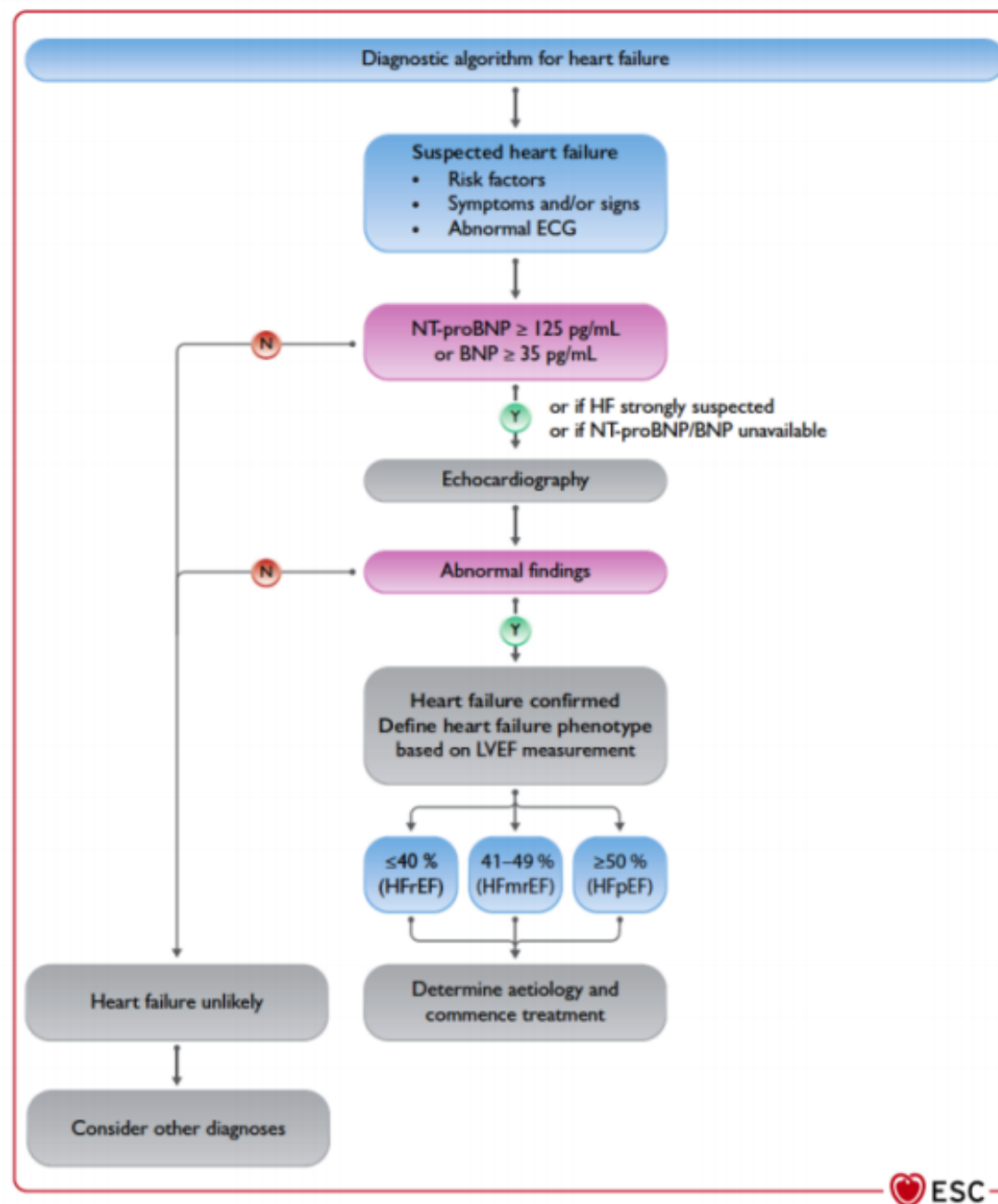
Mid Range -> Mildly Reduced

Type of HF		HFrEF	HFmrEF	HFpEF
CRITERIA	1	Symptoms ± Signs ^a	Symptoms ± Signs ^a	Symptoms ± Signs ^a
	2	LVEF ≤40%	LVEF 41–49% ^b	LVEF ≥50%
	3	-	- 	Objective evidence of cardiac structural and/or functional abnormalities consistent with the presence of LV diastolic dysfunction/raised LV filling pressures, including raised natriuretic peptides ^c

^bFor the diagnosis of HFmrEF, the presence of other evidence of structural heart disease (e.g. increased left atrial size, LV hypertrophy or echocardiographic measures of impaired LV filling) makes the diagnosis more likely.

^cFor the diagnosis of HFpEF, the greater the number of abnormalities present, the higher the likelihood of HFpEF.

*Of note, patients with a history of overtly reduced LVEF ($\leq 40\%$), who later present with LVEF $\geq 50\%$, should be considered to have recovered HFrEF or 'HF with improved LVEF' (rather than HFpEF). Continued treatment for HFrEF is recommended in these patients.²⁷¹



Diagnostic workup of new onset acute heart failure

Patient history, signs and/or symptoms suspected of acute HF

- Electrocardiogram
- Pulse oximetry
- Echocardiography
- Initial laboratory investigations^a
- Chest X-ray
- Lung ultrasound
- Other specific evaluations^b

Natriuretic peptide testing

- BNP <100 pg/mL
- NT-proBNP <300 pg/mL
- MR-proANP <120 pg/mL

Acute heart failure ruled out

- BNP ≥ 100 pg/mL
- NT-proBNP ≥ 300 pg/mL^c
- MR-proANP ≥ 120 pg/mL

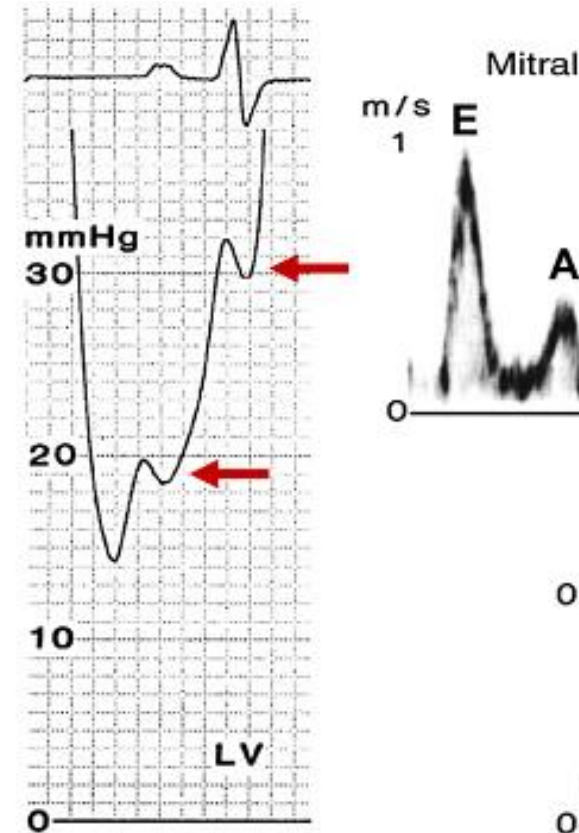
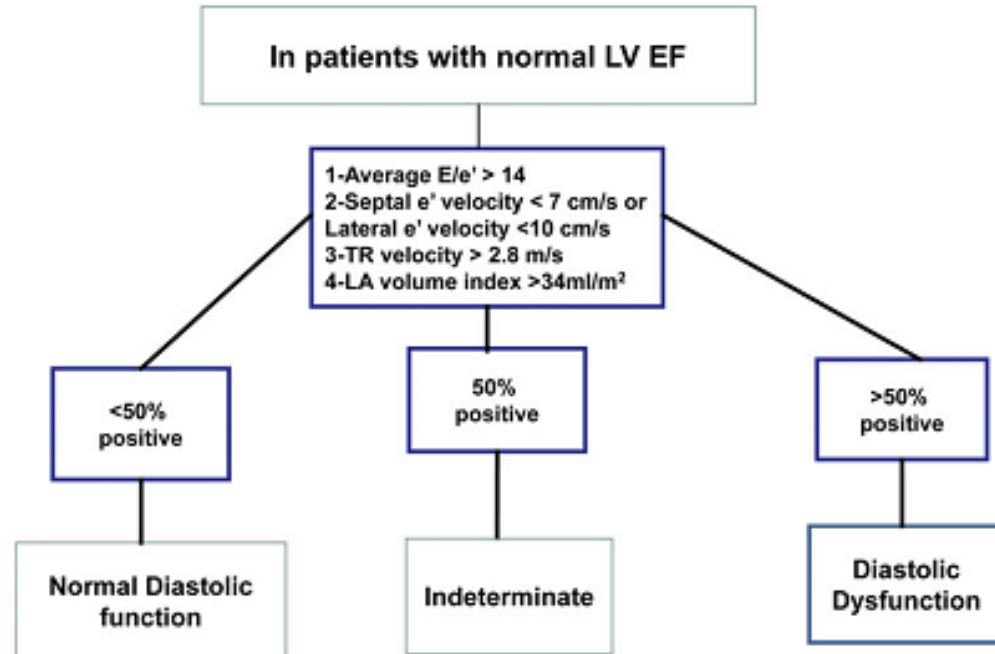
Acute heart failure confirmed

Comprehensive echocardiography

Table 9 Objective evidence of cardiac structural, functional and serological abnormalities consistent with the presence of left ventricular diastolic dysfunction/raised left ventricular filling pressures^{259,261}

Parameter ^a	Threshold	Comments
LV mass index Relative wall thickness	≥95 g/m ² (Female), ≥115 g/m ² (Male) >0.42	Although the presence of concentric LV remodelling or hypertrophy is supportive, the absence of LV hypertrophy does not exclude the diagnosis of HFpEF
LA volume index ^a	>34 mL/m ² (SR)	In the absence of AF or valve disease, LA enlargement reflects chronically elevated LV filling pressure (in the presence of AF, the threshold is >40 mL/m ²)
E/e' ratio at rest ^a	>9	Sensitivity 78%, specificity 59% for the presence of HFpEF by invasive exercise testing, although reported accuracy has varied. A higher cut-off of 13 had lower sensitivity (46%) but higher specificity (86%). ^{71,259,274}
NT-proBNP BNP	>125 (SR) or >365 (AF) pg/mL >35 (SR) or >105 (AF) pg/mL	Up to 20% of patients with invasively proven HFpEF have NPs below diagnostic thresholds, particularly in the presence of obesity
PA systolic pressure TR velocity at rest ^a	>35 mmHg >2.8 m/s	Sensitivity 54%, specificity 85% for the presence of HFpEF by invasive exercise testing ^{259,261}

Διαστολική Δυσλειτουργία

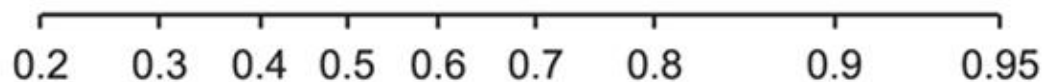


	Clinical Variable	Values	Points
H₂	H heavy	Body mass index > 30 kg/m ²	2
	H ypertensive	2 or more antihypertensive medicines	1
F	Atrial F ibrillation	Paroxysmal or Persistent	3
P	P ulmonary Hypertension	Doppler Echocardiographic estimated Pulmonary Artery Systolic Pressure > 35 mmHg	1
E	E lder	Age > 60 years	1
F	F illing Pressure	Doppler Echocardiographic E/e' > 9	1
H₂FPEF score			Sum (0-9)

Total Points

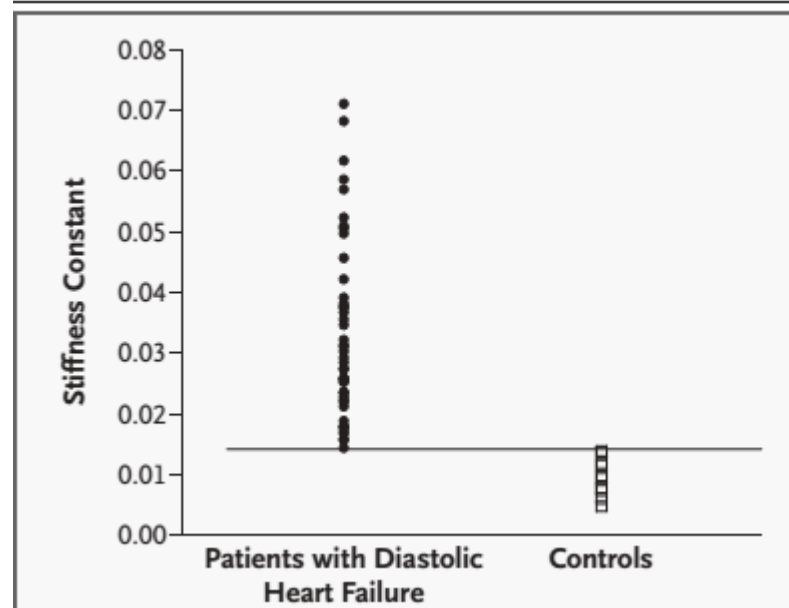
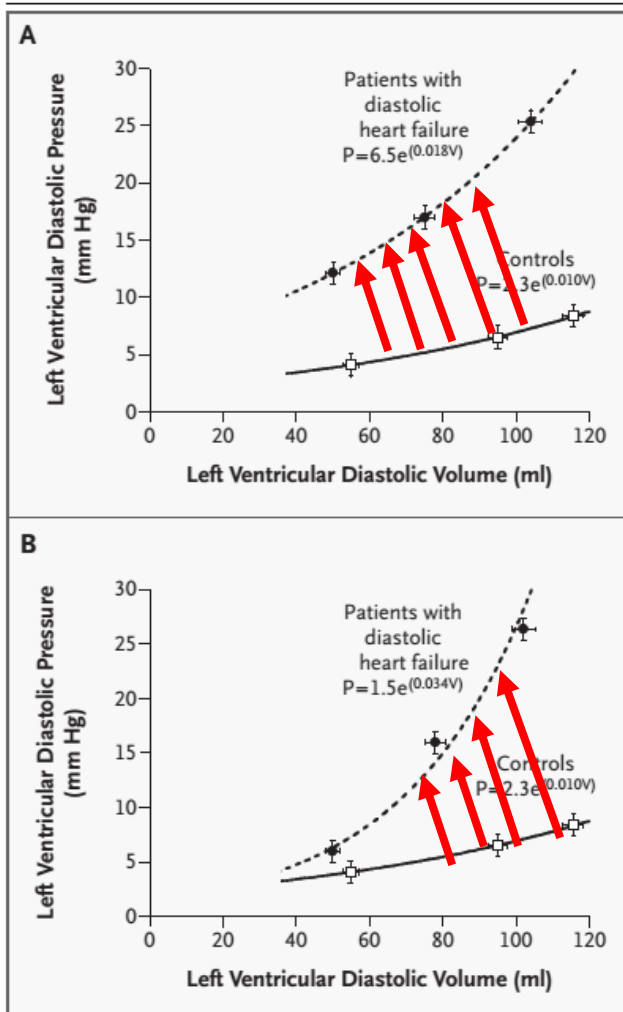


Probability of HFpEF



Διαστολική Καρδιακή Ανεπάρκεια Υπάρχει;

Οι ασθενείς με «διαστολική» ΚΑ παρουσιάζουν διαταραχές στη διαστολική λειτουργία και χάλαση της αριστεράς κοιλίας με μετατόπιση προς τα πάνω της καμπύλης πίεσης-όγκου



The NEW ENGLAND JOURNAL of MEDICINE

ORIGINAL ARTICLE

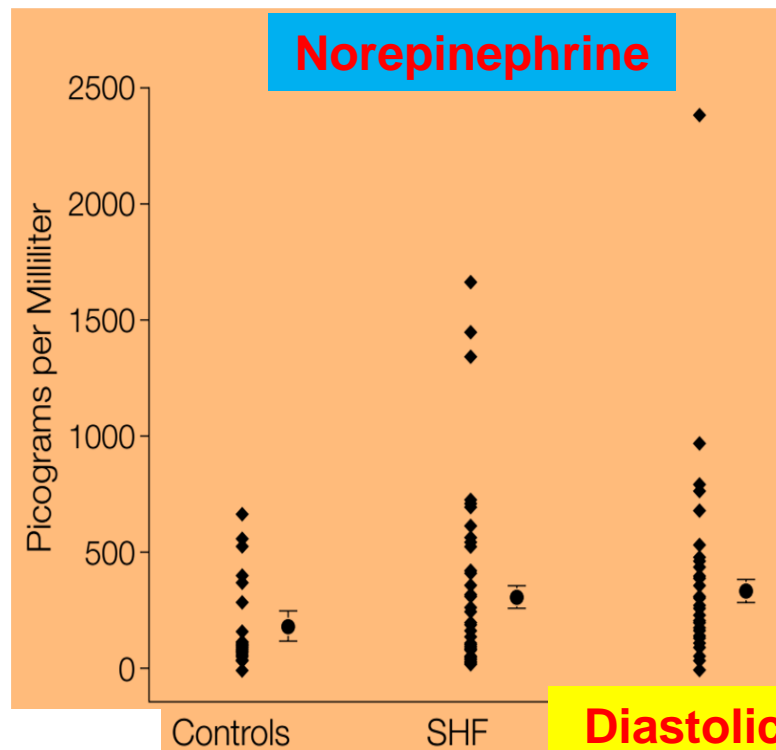
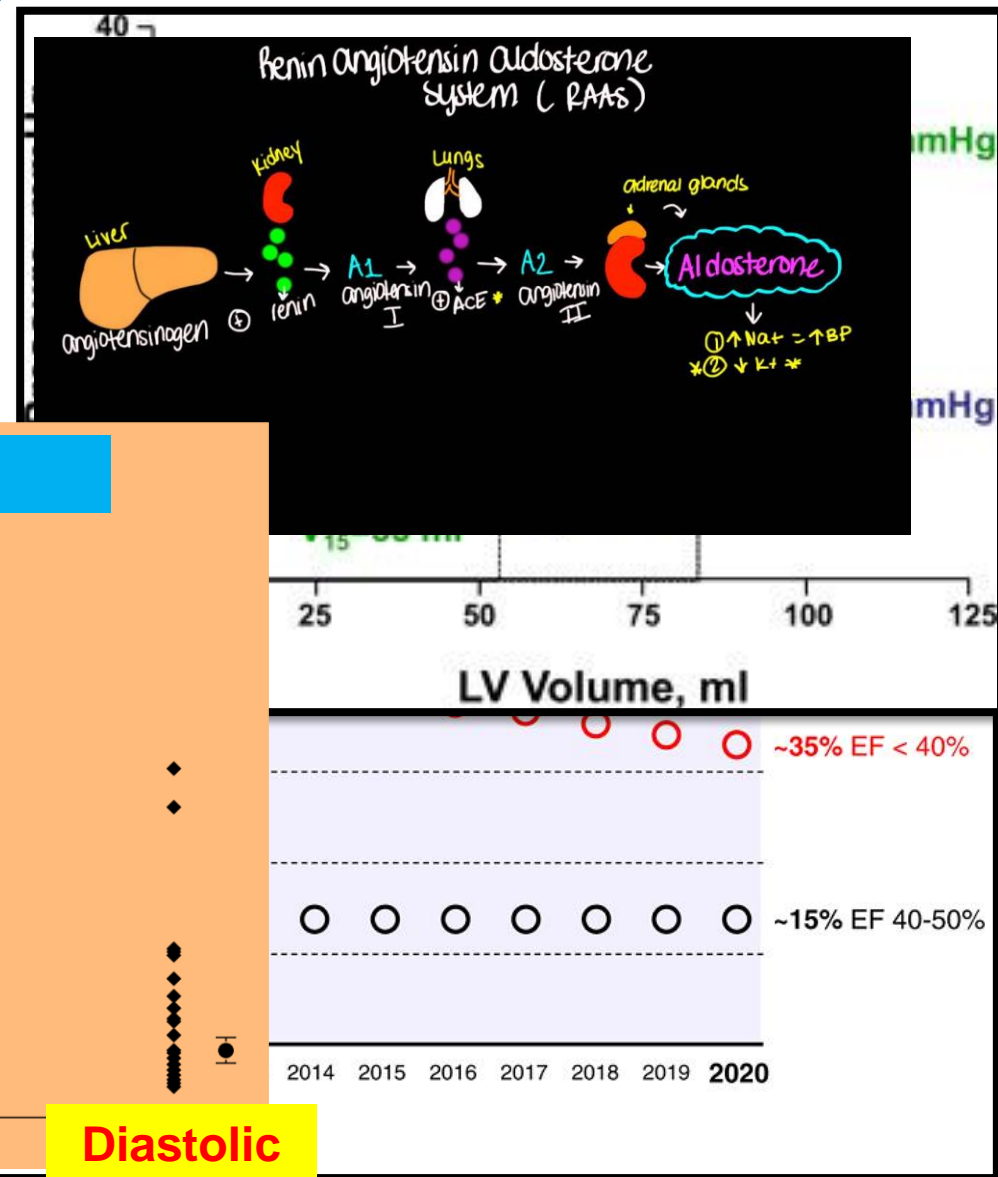
Diastolic Heart Failure — Abnormalities
in Active Relaxation and Passive Stiffness
of the Left Ventricle

Michael R. Zile, M.D., Catalin F. Baicu, Ph.D., and William H. Gaasch, M.D.

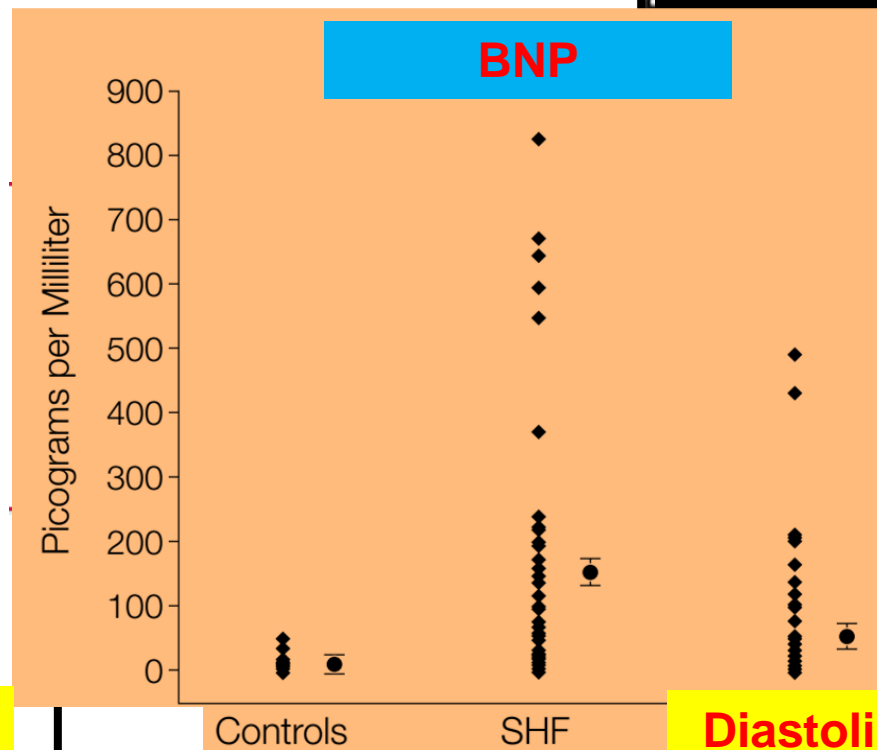
Υπάρχει;

Υπάρχει

- I. Περιγράφεται στις Κατευθυντήριες Οδηγίες
- II. Στις επιδημιολογικές μελέτες αποτελεί το μισό του πληθυσμού της ΚΑ
- III. Παρατηρούνται τυπικές αιμοδυναμικές μεταβολές (π.χ \uparrow Τελοδιαστολικών πιέσεων πλήρωσης)
- IV. Παρατηρείται ενεργοποίηση του νευροορμονικού άξονα (ρενίνης-αγγειοτασίνης αλδοστερόνης, συμπαθητικού νευρικού συστήματος).



Diastolic
HF



Diastolic
HF

Καρδιακή Ανεπάρκεια με διατηρημένο κλάσμα εξώθησης

Είναι ένα μεταβατικό στάδιο στην εξέλιξη προς της HFrEF;

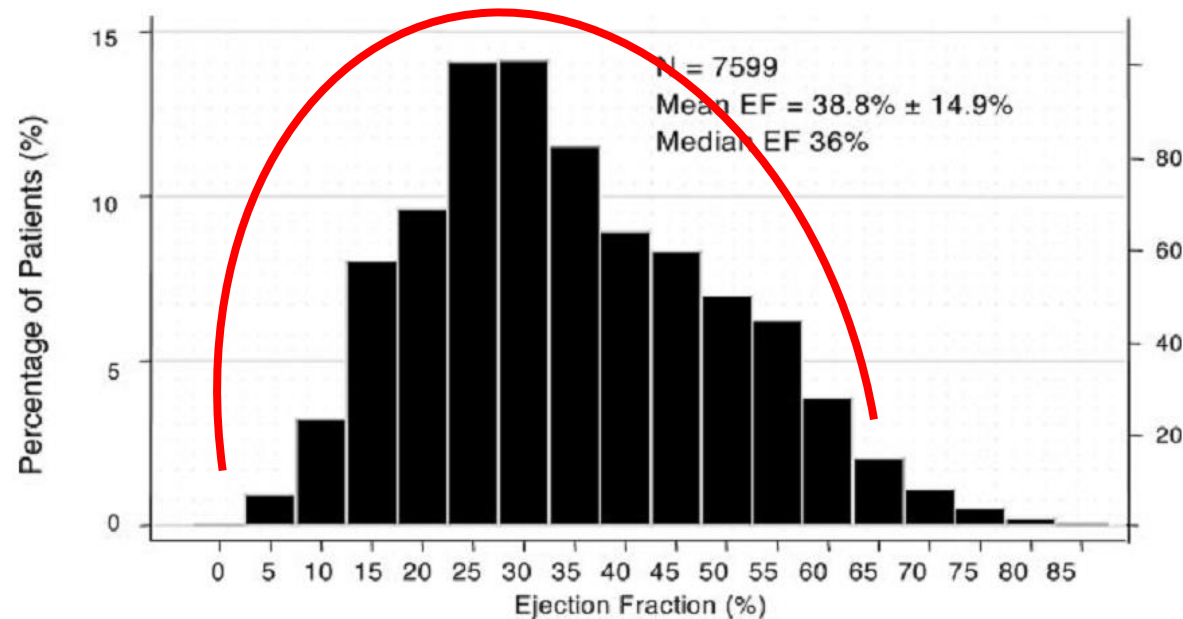
HFrEF ως
μεταβατικό στάδιο
προς την HFrEF

HFrEF ως ξεχωριστή
οντότητα από την
HFrEF

Μονοκόρυφη κατανομή του
LVEF σε επιδημιολογικές
μελέτες

Ήπιες διαταραχές της
συστολικής λειτουργίας στην
HFrEF και σοβαρή
διαστολική δυσλειτουργία
στην HFrEF

Έκκεντρη υπερτροφία της
αριστεράς κοιλίας σε
περιπτώσεις ΚΑ σε
υπερτασικούς ασθενείς



Influence of Ejection Fraction on Cardiovascular Outcomes
in a Broad Spectrum of Heart Failure Patients

CHARM

Είναι ένα μεταβατικό στάδιο στην εξέλιξη προς της HFrEF;

HFrEF ως
μεταβατικό στάδιο
προς την HFrEF

HFrEF ως ξεχωριστή
οντότητα από την
HFrEF

Μονοκόρυφη κατανομή της
KA σε επιδημιολογικές
μελέτες

Ήπιες διαταραχές της
συστολικής λειτουργίας στην
HFrEF και σοβαρή διαστολική
δυσλειτουργία στην HFrEF

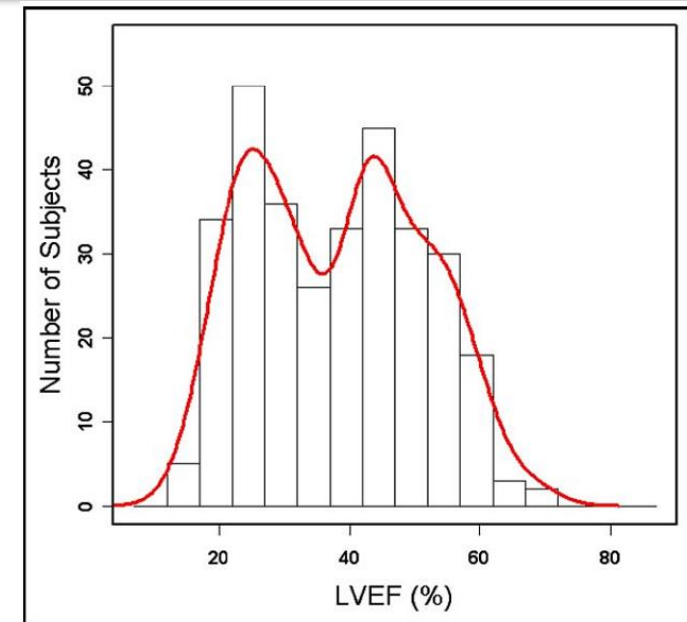
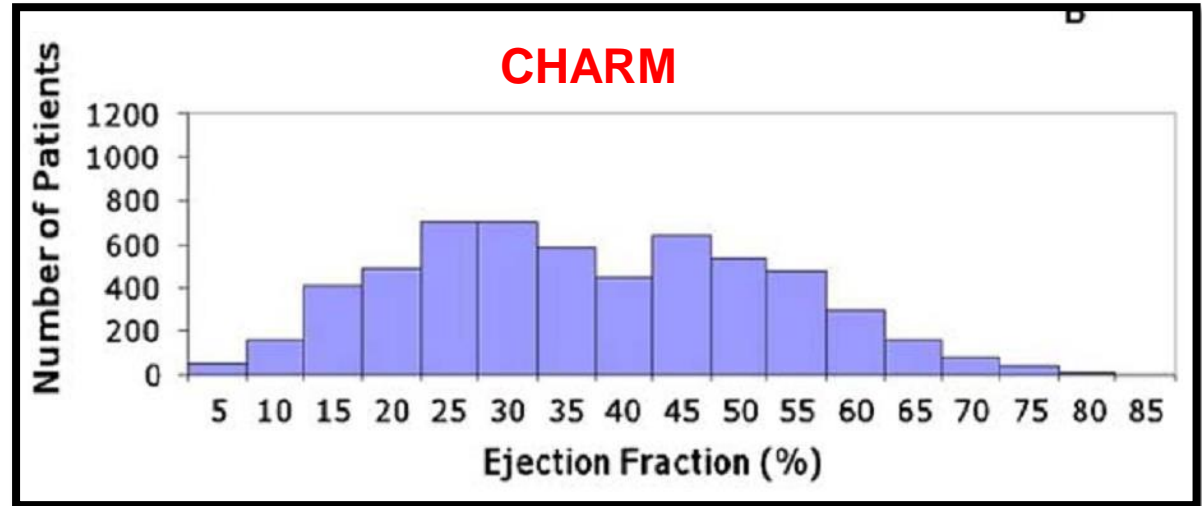
Έκκεντρη υπερτροφία της
αριστεράς κοιλίας σε
περιπτώσεις KA σε
υπερτασικούς ασθενείς

Δικόρυφη Κατανομή της KA σε
επιδημιολογικές μελέτες

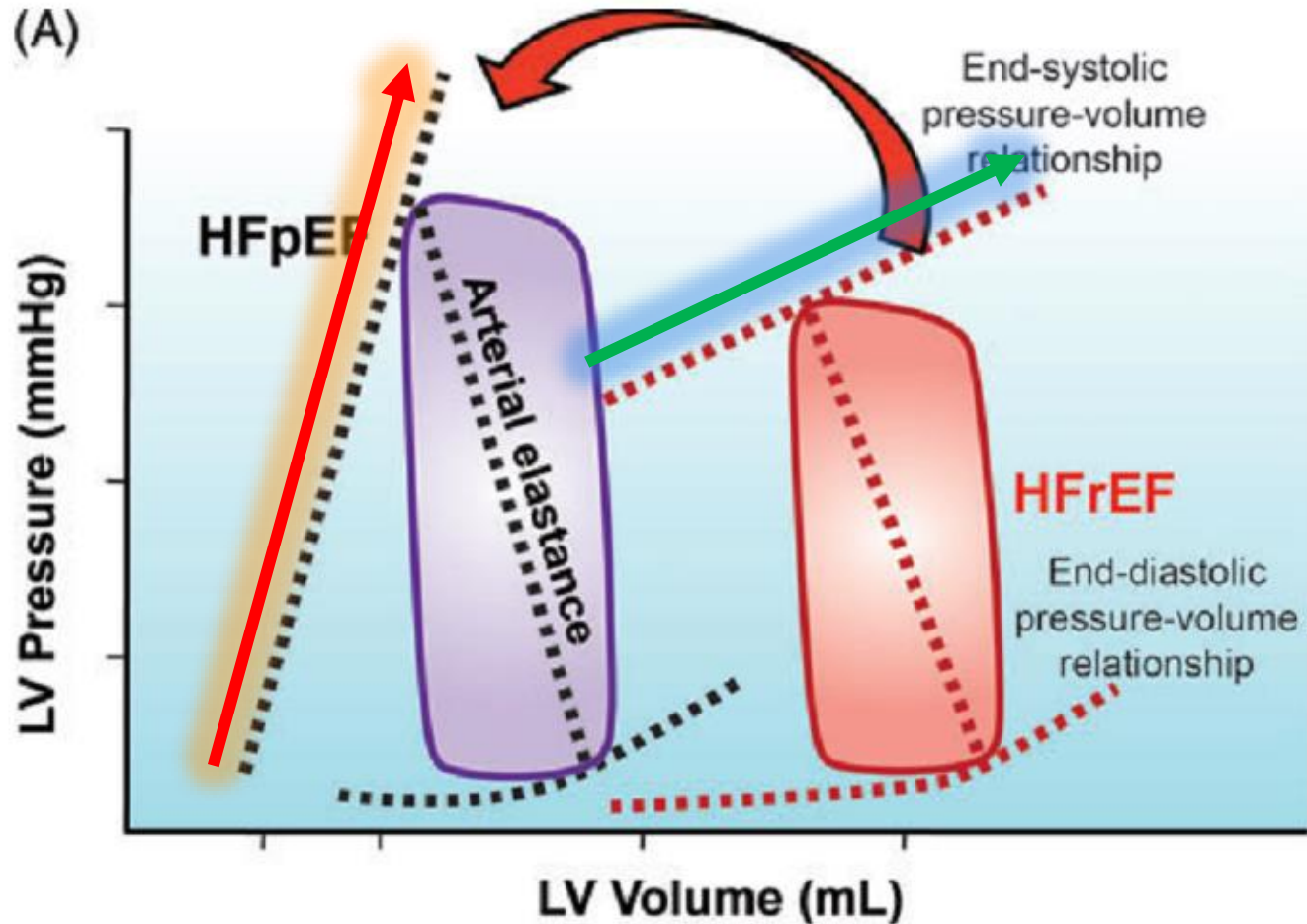
Διαφορετική απάντηση στη
θεραπεία

Διαφορετικά πρότυπα
υπερτροφίας της αριστεράς
κοιλίας

Διαφορετικές μεταβολές σε
κυτταρικό, υποκυτταρικό
επίπεδο και στην εξωκυττάρια
θεμέλια ουσία



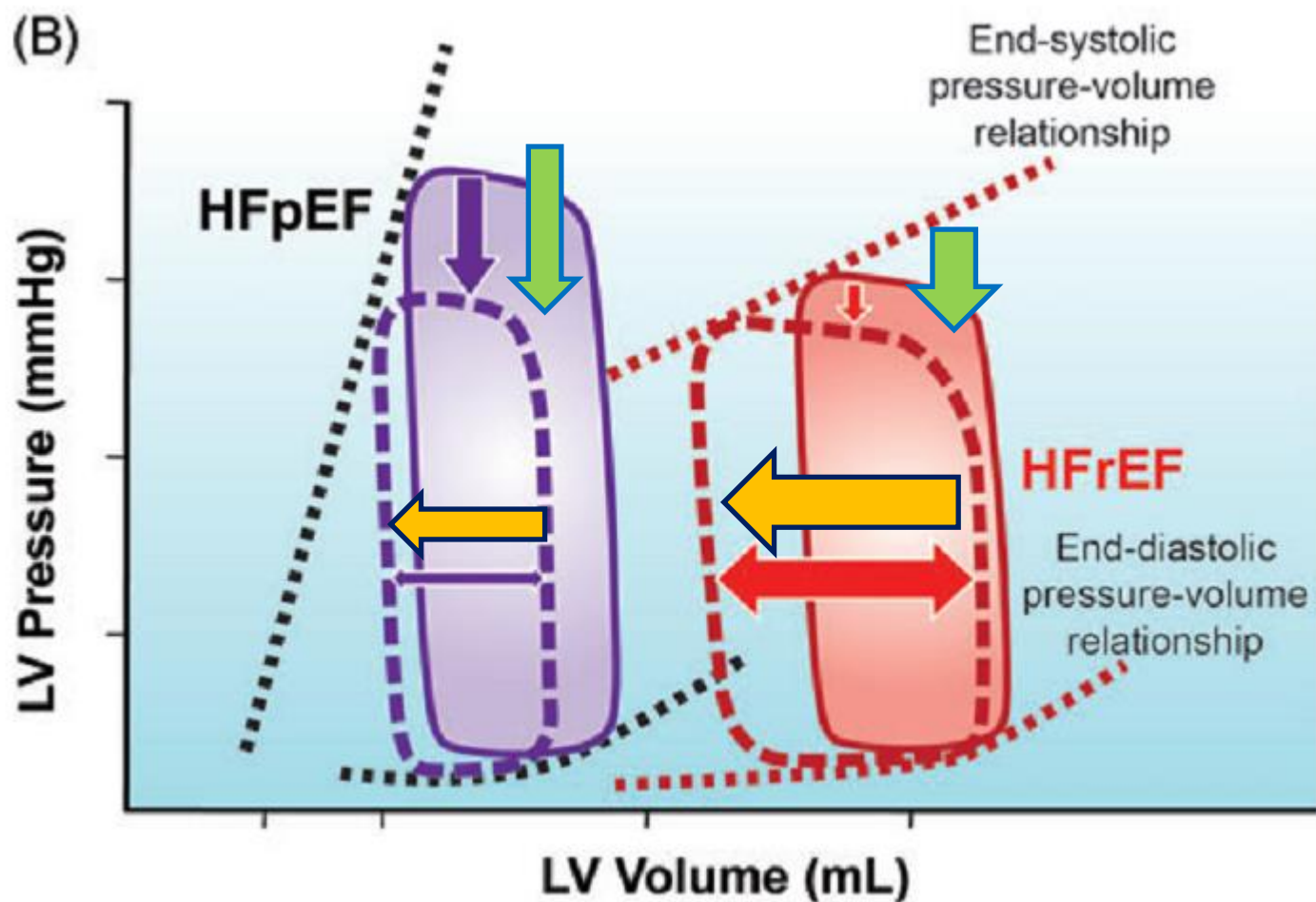
*Καρδιακή Ανεπάρκεια με διατηρημένο κλάσμα εξώθησης
Είναι ένα μεταβατικό στάδιο στην εξέλιξη προς της HFrEF;
Διαφορετικές Λειτουργικές/Αιμοδυναμικές Παράμετροι*



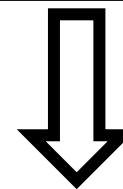
Απότομη κλίση της καμπύλης πίεσης όγκου στην τελοσυστολή (\uparrow elastance-ελαστότητας) σε ασθενείς με HFpEF

Μειωμένη κλίση της καμπύλης πίεσης όγκου στην τελοσυστολή (\downarrow elastance-ελαστότητας) σε ασθενείς HFrEF

*Καρδιακή Ανεπάρκεια με διατηρημένο κλάσμα εξώθησης
Είναι ένα μεταβατικό στάδιο στην εξέλιξη προς της HFrEF;
Διαφορετικές Λειτουργικές/Αιμοδυναμικές Παράμετροι
Διαφορές στη θεραπεία*



*Χορήγηση
Αγγειοδιασταλτικών*

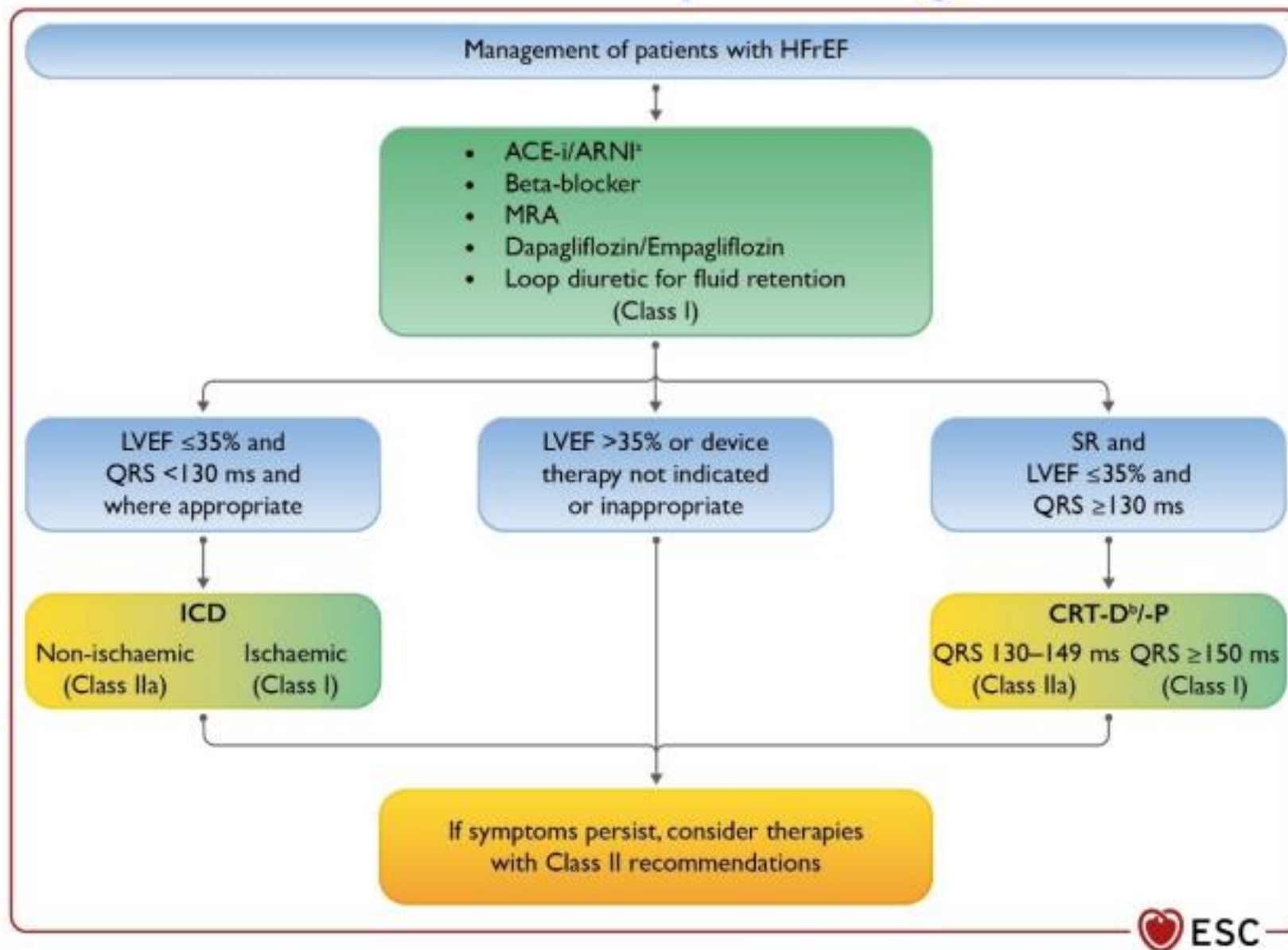


*HFrEF
Μικρή πτώση της ΑΠ
Μεγάλη Αύξηση του Όγκου Παλμού*



*HFpEF
Μεγάλη πτώση της ΑΠ
Μικρή Αύξηση του Όγκου Παλμού*

2021 HFrEF Therapeutic algorithm



Pharmacological treatments indicated in patients with HFrEF ESC

Recommendations	Class	Level
An ACE-I is recommended for patients with HFrEF to reduce the risk of HF hospitalization and death.	I	A
A beta-blocker is recommended for patients with stable HFrEF to reduce the risk of HF hospitalization and death.	I	A
An MRA is recommended for patients with HFrEF to reduce the risk of HF hospitalization and death.	I	A
Dapagliflozin or empagliflozin are recommended for patients with HFrEF to reduce the risk of HF hospitalization and death.	I	A
Sacubitril/valsartan is recommended as a replacement for an ACE-I in patients with HFrEF to reduce the risk of HF hospitalization and death.	I	B

Other pharmacological treatments indicated in selected patients with HFrEF (3)



Recommendations	Class	Level
Soluble guanylate cyclase receptor stimulator		
Vericiguat may be considered in patients in NYHA class II-IV who have had worsening HF despite treatment with an ACE-I (or ARNI), a beta-blocker and an MRA to reduce the risk of CV mortality or HF hospitalization.	IIb	B
Hydralazine and isosorbide dinitrate		
Hydralazine and isosorbide dinitrate should be considered in self-identified black patients with LVEF $\leq 35\%$ or with an LVEF $< 45\%$ combined with a dilated left ventricle in NYHA class III/IV despite treatment with an ACE-I (or ARNI), a beta-blocker and an MRA to reduce the risk of HF hospitalization and death.	IIa	B

To reduce HF hospitalization/mortality - for selected patients

Volume overload

Diuretics

SR with LBBB ≥ 150 ms

CRT-P/D

SR with LBBB 130–149 ms or non LBBB ≥ 150 ms

CRT-P/D

Ischaemic aetiology

ICD

Non-ischaemic aetiology

ICD

Atrial fibrillation

Anticoagulation

Atrial fibrillation

Digoxin

PVI

Coronary artery disease

CABG

Iron deficiency

Ferric carboxymaltose

Aortic stenosis

SAVR/TAVI

Mitral regurgitation

TEE MV Repair

Heart rate SR > 70 bpm

Ivabradine

Black Race

Hydralazine/ISDN

ACE-I/ARNI intolerance

ARB

- Ορισμός / ορολογία / Διάγνωση
- Θεραπεία HFrEF
- **Θεραπεία HFmrEF**
- Θεραπεία HFpEF
- Προχωρημένη ΚΑ (*advance HF*)
- Οξεία ΚΑ

Pharmacological treatments to be considered in patients with (NYHA class II-IV) heart failure with mildly reduced ejection fraction



Recommendations	Class ^a	Level ^b
Diuretics are recommended in patients with congestion and HFmrEF in order to alleviate symptoms and signs.	I	C
An ACE-I may be considered for patients with HFmrEF to reduce the risk of HF hospitalization and death.	IIb	C
An ARB may be considered for patients with HFmrEF to reduce the risk of HF hospitalization and death.	IIb	C
A beta-blocker may be considered for patients with HFmrEF to reduce the risk of HF hospitalization and death.	IIb	C
An MRA may be considered for patients with HFmrEF to reduce the risk of HF hospitalization and death.	IIb	C
Sacubitril/valsartan may be considered for patients with HFmrEF to reduce the risk of HF hospitalization and death.	IIb	C

ACE-I = angiotensin-converting enzyme inhibitor; ARB = angiotensin-receptor blocker; MRA = mineralocorticoid receptor antagonist; NYHA= New York Heart Association.

^a Class of recommendations. ^b Level of evidence.

- Ορισμός / ορολογία / Διάγνωση
- Θεραπεία HFrEF
- Θεραπεία HFmrEF
- **Θεραπεία HFpEF**
- Προχωρημένη ΚΑ (*advance HF*)
- Οξεία ΚΑ

Background to HFpEF

- Historical changes in nomenclature and lack of consensus on the optimal LVEF cut-off to define the group of HF without overtly reduced LVEF
- Considered if HF with higher LVEFs should be named HF with 'normal' EF
 - Given the known variability of echo measurements of LVEF, the difficulties in interpreting LVEF measured using different imaging modalities, and remaining controversies regarding the precise LVEF cut-off to define 'normal', this guideline has kept to the nomenclature of HF with 'preserved' EF using a LVEF cut-off of 50%
- LVEF is a continuous variable with a normal distribution in the general population, and the cut-offs used in definitions are therefore arbitrary
- HF with a very high LVEF (e.g. above 65-70%) should prompt a search for pathology (e.g. cardiac amyloidosis or hypertrophic cardiomyopathy)

Treatment of HFpEF

- To date, no treatment has been shown to convincingly reduce mortality and morbidity in patients with HFpEF, although improvements have been seen for some specific phenotypes of patients within the overall HFpEF umbrella
- The Task Force acknowledges that the treatment options for HFpEF are being revised as this guideline is being published

Recommendations for treatment of patients with heart failure with preserved ejection fraction



Recommendations	Class ^a	Level ^b
Screening for, and treatment of, aetiologies, and cardiovascular and non-cardiovascular comorbidities is recommended in patients with HFpEF (see relevant sections of this document).	I	C
Diuretics are recommended in congested patients with HFpEF in order to alleviate symptoms and signs.	I	C

Reducing body weight in obese patients and increasing exercise may further improve symptoms and exercise capacity and should therefore be considered in appropriate patients.

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

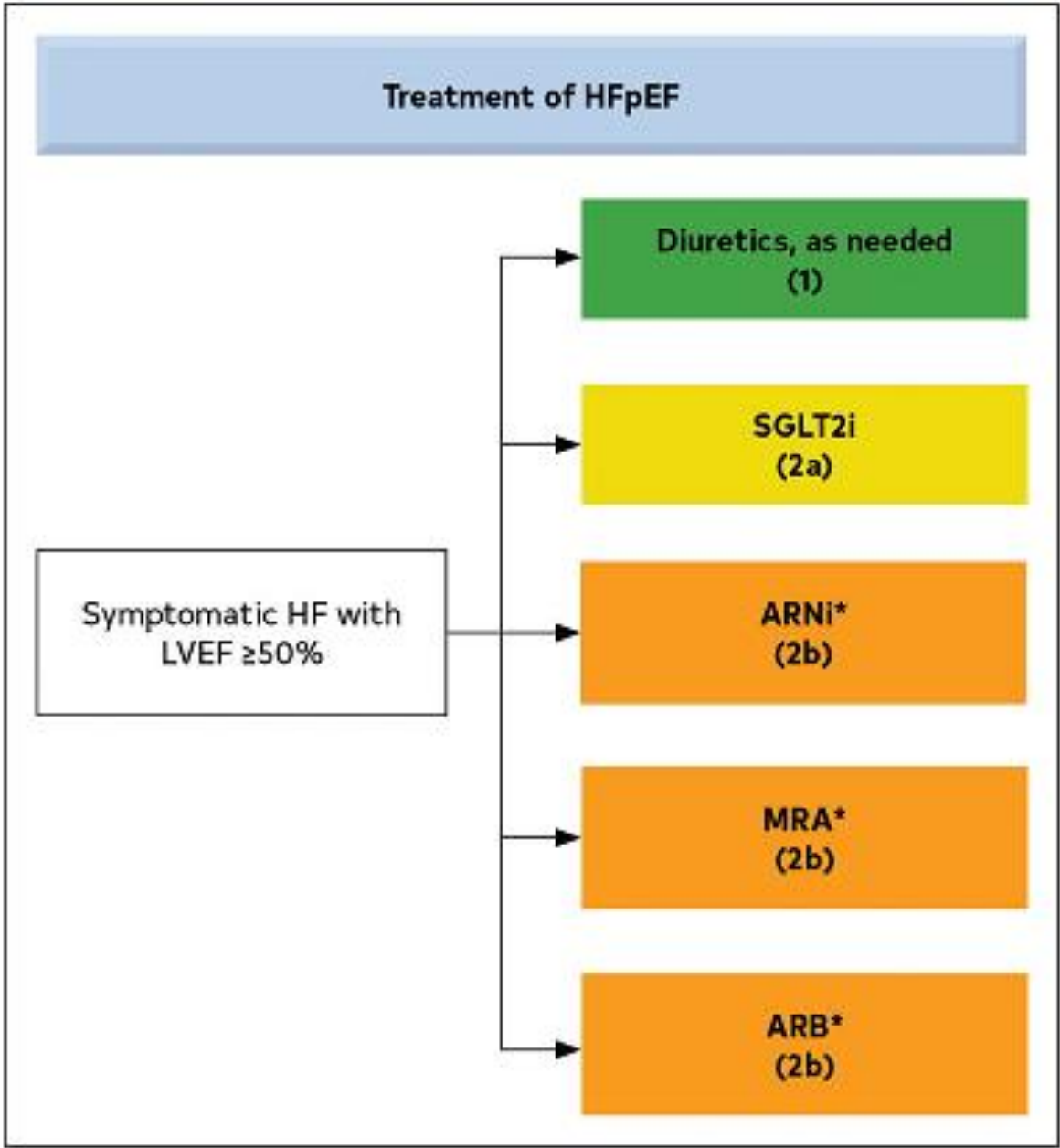


Figure 12. Recommendations for Patients With Preserved LVEF ($\geq 50\%$).