ΚΑΡΔΙΑΚΗ ΑΝΕΠΑΡΚΕΙΑ
ΘΕΡΑΠΕΙΑ

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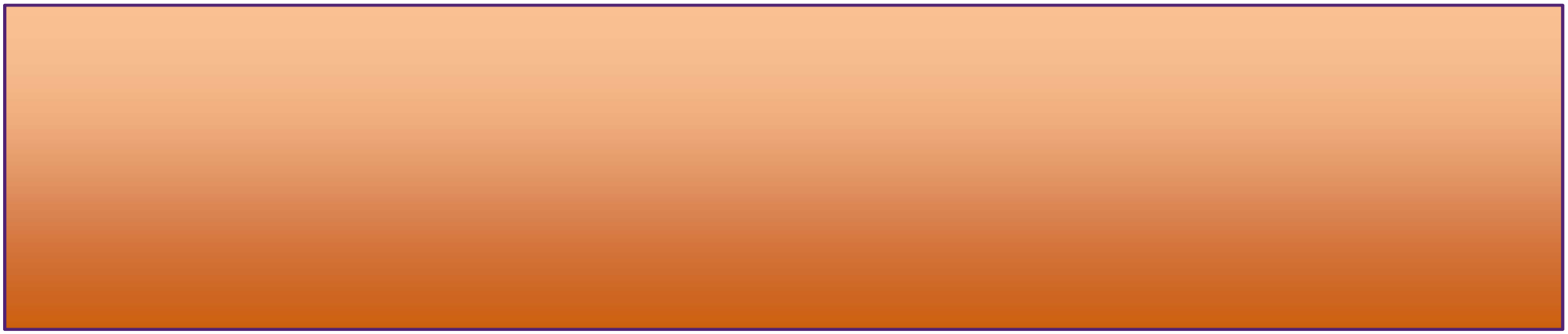

ΧΡΟΝΙΑ ΚΑΡΔΙΑΚΗ ΑΝΕΠΑΡΚΕΙΑ

Βασικοί θεραπευτικοί στόχοι

λληψη της δημιουργίας και της επιδείνωσης της ΚΑ

εμπόδιση της μετάπτωσης της ασυμπτωματικής δυσλειτουργίας της αρ. κοιλίας σε τωματική ΚΑ

ττωση της θνητότητας που συνεπάγεται η ΚΑ

λειψη ή έστω η βελτίωση της συμπτωματολογίας του ασθενούς με ΚΑ

ωση των νοσηλειών που σχετίζονται με ΚΑ

τίωση της ποιότητας ζωής ασθενών με ΚΑ

ommendations for the primary prevention of heart failure in patients risk factors for its development

mmendations	Class	Level
tment of hypertension is recommended to prevent or delay the onset of HF, o prevent HF hospitalizations.	I	A
tment with statins is recommended in patients at high risk of CV disease or CV disease in order to prevent or delay the onset of nd to prevent HF hospitalizations.	I	A
2 inhibitors (canagliflozin, dapagliflozin, empagliflozin, ertugliflozin, gliflozin) are recommended in patients with diabetes at high risk of CV disease th CV disease in order to prevent HF hospitalizations.	I	A
selling against sedentary habit, obesity, cigarette smoking, and alcohol abuse commended to prevent or delay the onset of HF.	I	C

vascular; HF=heart failure; SGLT2=sodium-glucose co-transporter 2.

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(European Heart Journal 2021 – doi:10.1093/eurheartj/ehab368)

γενικές οδηγίες- γενικά μέτρα

νικές οδηγίες αφορούν:

ην καθημερινή ζύγιση
η συμμετοχή σε κοινωνικές εκδηλώσεις
ην εργασία
α ταξίδια
ους εμβολιασμούς και
ην αντισύλληψη και ορμονική υποκατάσταση

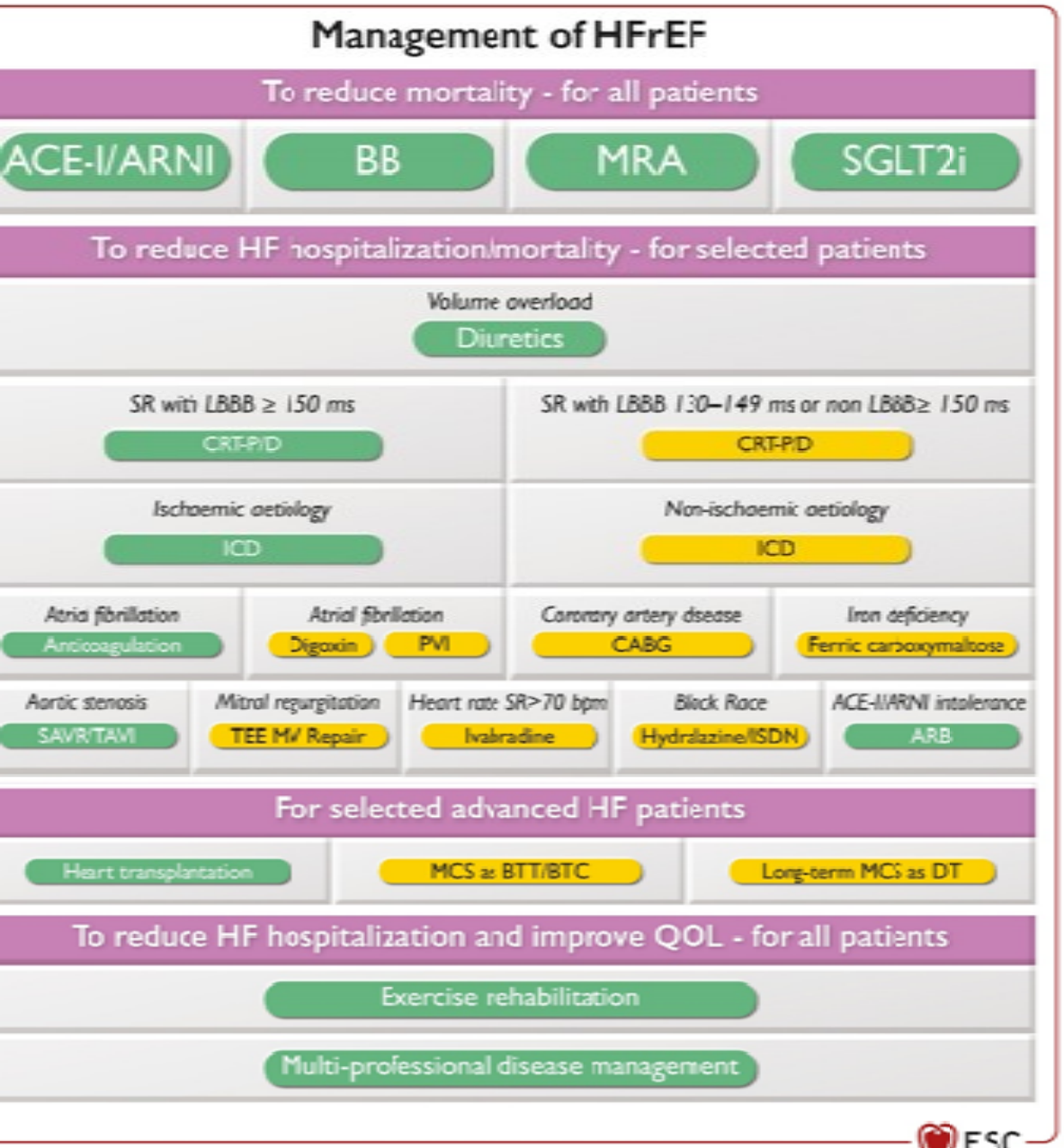
Συστάσεις

γενικά μέτρα εντάσσονται οι συστάσεις για:

η δίαιτα
ο κάπνισμα
η χρήση οινοπνεύματος,
η σωματική άσκηση και
η σωματική ανάπαυση

Παραγοντες που επιδεινώνουν την καρδιακή ανεπάρκεια

- Μη συμμόρφωση του ασθενούς στην θεραπευτική αγωγή (φάρμακα, περιορισμός άλατος και αλκοόλ)
- Αρρύθμιστη υπέρταση
- Επίπτωση άλλου καρδιολογικού αιτίου (έμφραγμα, ταχυ/βραδυαρρυθμίας, βαλβιδοπάθειας, ενδοκαρδίτιδος, πνευμονικής εμβολής κ.α.)
- Αίτια υπερδυναμικής κυκλοφορίας (αναιμία, κύηση, υπερθυεοειδισμός)
- Λοίμωξη (π.χ. Πνευμονία)
- Λήψη καρδιολογικών αρνητικών ινότροπων φαρμάκων (αντιαρρυθμικά, ca+ blockers)
- Λήψη κορτιζόλης NSAID,νεώτερων υπογλυκαιμικών κ.α



Strategic phenotypic overview of the management of heart failure with reduced ejection fraction

ACE-I = angiotensin-converting enzyme inhibitor; ARB = angiotensin receptor blocker; ARNI = angiotensin receptor-neprilysin inhibitor; BB = beta-blocker; b.p.m. = beats per minute; BTC = bridge to candidacy; BTT = bridge to transplantation; CABG = coronary artery bypass graft; CRT-D = cardiac resynchronization therapy with defibrillator; CRT-P = cardiac resynchronization therapy pacemaker; DT = destination therapy; HF = heart failure; HFrEF = heart failure with reduced ejection fraction; ICD = implantable cardioverter-defibrillator; ISDN = isosorbide dinitrate; LBBB = left bundle branch block; MCS = mechanical circulatory support; MRA = mineralocorticoid receptor antagonist; MV = mitral valve; PVI = pulmonary vein isolation; QOL = quality of life; SAVR = surgical aortic valve replacement; SGLT2i = sodium-glucose co-transporter 2 inhibitor; SR = sinus rhythm; TAVI = transcatheter aortic valve replacement; TEE = transcatheter edge to edge. Colour code for classes of recommendations: Green for Class of recommendation I; Yellow for Class of recommendation IIa (see Table 1 for further details on classes of recommendation).
The Figure shows management options with Class I and IIa recommendations. See the specific Tables for those with Class IIb recommendations.

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tidisciplinary interventions recommended for the management of onic heart failure

mmendations	Class	Level
ecommended that HF patients are enrolled in a multidisciplinary HF agement programme to reduce the risk of HF hospitalization and mortality	I	A
management strategies are recommended to reduce the risk of HF italization and mortality.	I	A
r home-based and/or clinic-based programmes improve outcomes and are mmended to reduce the risk of HF hospitalization and mortality.	I	A
enza and pneumococcal vaccinations should be considered in order to ent HF hospitalizations.	IIa	B

failure.

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ortant characteristics and components in a heart failure
agement program (2)

ponents
timized management; lifestyle choices, pharmacological and devices
tient education, with special emphasis on self-care and symptom management
ovision of psychosocial support to patients and family caregivers
llow-up after discharge (clinic; home visits; telephone support or telemonitoring)
sy access to healthcare, especially to prevent and manage decompensation
sessment of (and appropriate intervention in response to) an unexplained change in eight, nutritional and functional status, QOL, sleep problems, psychosocial problems or her findings (e.g., laboratory values)
cess to advanced treatment options; supportive and palliative care

l fibrillation; BNP = B-type natriuretic peptide; E/e' ratio = early filling velocity on transmitral Doppler/early relaxation velocity on tissue Doppler; HFpEF = heart failure erved ejection fraction; NP = natriuretic peptide; NT-proBNP = N-terminal pro-B-type natriuretic peptide; SR = sinus rhythm. Note: The greater the number of abnormalities he higher the likelihood of HFpEF. [a]Only commonly used indices are listed in the table; for less commonly used indices refer to the consensus document of the ESC/HFA.

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ommendations for exercise rehabilitation in patients with chronic rt failure

mmendations	Class	Level
cise is recommended for all patients who are able in order to improve cise capacity, QOL, and reduce HF hospitalization.[a]	I	A
pervised, exercise-based, cardiac rehabilitation programme should be dered in patients with more severe disease, frailty, or with comorbidities.	IIa	C

t failure; QOL = quality of life.
who are able to adhere to the exercise programme.

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ommendations for telemonitoring

mmendations	Class	Level
invasive HTM may be considered for patients with HF in order to reduce the f recurrent CV and HF hospitalizations and CV death.	IIb	B
itoring of pulmonary artery pressure using a wireless haemodynamic toring system may be considered in symptomatic patients with HF in order to ove clinical outcomes.	IIb	B

iovascular; HF = heart failure; HTM=home telemonitoring; LVEF = left ventricular ejection fraction.

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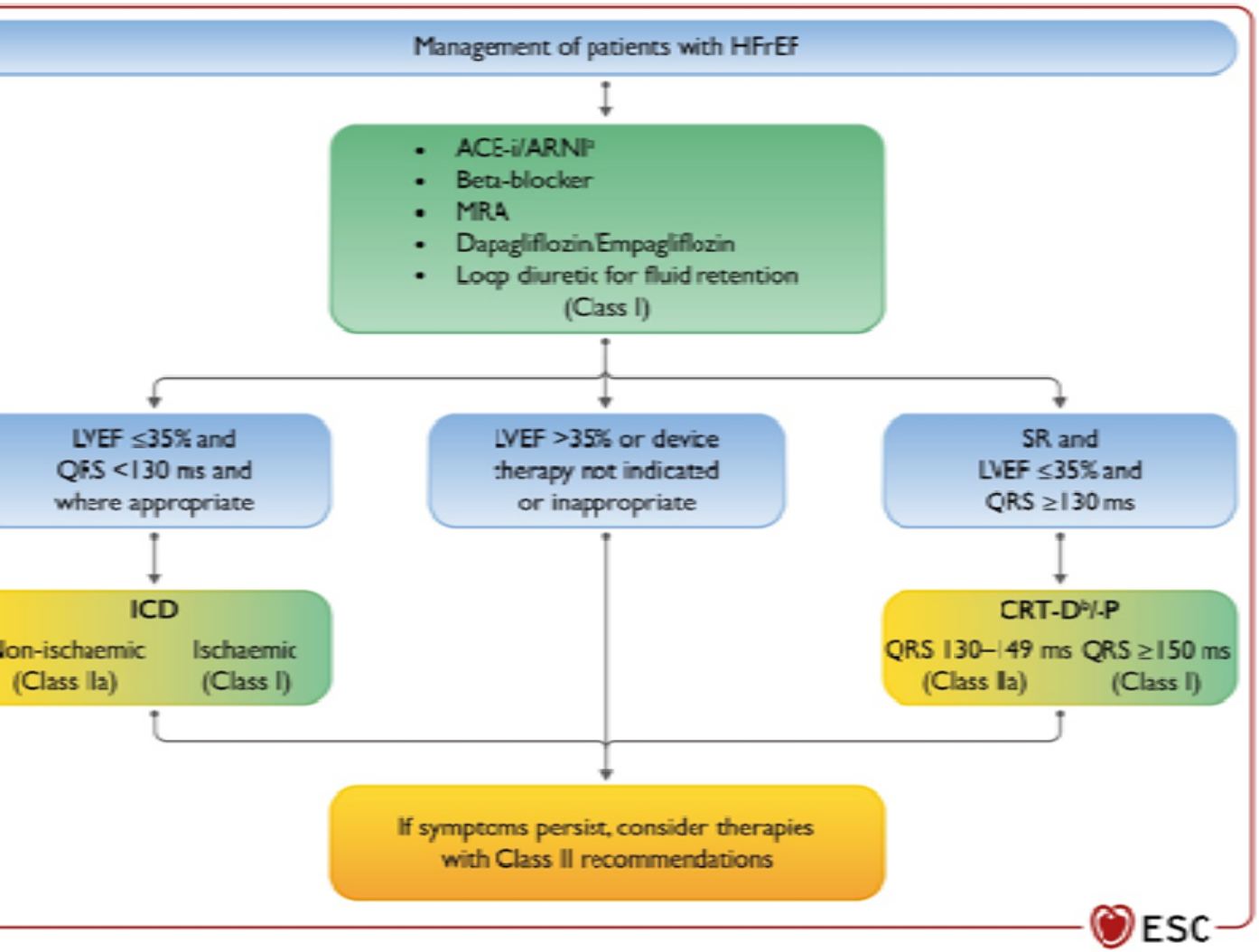

Therapeutic algorithm of Class I Therapy Indications for a patient with heart failure with reduced ejection fraction

ACE-I = angiotensin-converting enzyme inhibitor; ARNI = angiotensin receptor-neprilysin inhibitor; CRT-D = cardiac resynchronization therapy with defibrillator; CRT-P = cardiac resynchronization therapy pacemaker; ICD = implantable cardioverter-defibrillator; HFrEF = heart failure with reduced ejection fraction; MRA = mineralocorticoid receptor antagonist; QRS = Q, R, and S waves of an ECG; SR = sinus rhythm.

[a]As a replacement for ACE-I.

[b]Where appropriate. Class I=green. Class IIa=Yellow.

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rmacological treatments indicated in patients with (NYHA class II-IV) rt failure with reduced ejection fraction (LVEF ≤40%)

mmendations	Class	Level
CE-I is recommended for patients with HFrEF to reduce the risk of HF italization and death.	I	A
ta-blocker is recommended for patients with stable HFrEF to reduce the risk F hospitalization and death.	I	A
RA is recommended for patients with HFrEF to reduce the risk of HF italization and death.	I	A
agliflozin or empagliflozin are recommended for patients with HFrEF to ce the risk of HF hospitalization and death.	I	A
bitril/valsartan is recommended as a replacement for an ACE-I in patients HFrEF to reduce the risk of HF hospitalization and death.	I	B

giotensin-converting enzyme inhibitor; HF = heart failure; HFrEF = heart failure with reduced ejection fraction; LVEF = left ventricular ejection fraction; neralocorticoid receptor antagonist; NYHA = New York Heart Association.

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er pharmacological treatments indicated in selected patients with
A class II-IV heart failure with reduced ejection fraction (LVEF ≤40%) (1)

mmendations	Class	Level
diuretics		
tics are recommended in patients with HFrEF with signs and/or symptoms of estion to alleviate HF symptoms, improve exercise city, and reduce HF hospitalizations.	I	C
RB[a] is recommended to reduce the risk of HF hospitalization and eath in symptomatic patients unable to tolerate an ACE-I or ARNI ents should also receive a beta-blocker and an MRA).	I	B

giotensin-converting enzyme inhibitor; ARB = angiotensin-receptor blocker; ARNI = angiotensin receptor-neprilysin inhibitor; CV = cardiovascular; HF = heart failure; eart failure with reduced ejection fraction; MRA = mineralocorticoid receptor antagonist; NYHA = New York Heart Association.
with evidence in HFrEF are candesartan, losartan, and valsartan.

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Αναστολείς ΜΕΑ

WHY?

To improve symptoms and exercise capacity, reduce the risk of HF hospitalization, and increase survival.

IN WHOM AND WHEN?

Indications:

1. Patients with HFrEF.

Contraindications:

1. History of angioedema[b].
2. Known bilateral renal artery stenosis.
3. Pregnancy/risk of pregnancy.
4. Known allergic reaction/other adverse reaction (drug-specific).

Cautions/seek specialist advice:

1. Significant hyperkalaemia (K^+ >5.0 mmol/L).
2. Significant renal dysfunction [creatinine >221 μmol/L (>2.5 mg/dL) or eGFR <30 mL/min/1.73 m^2].
3. Symptomatic or severe asymptomatic hypotension (SBP <90 mmHg).
4. Drug interactions to look out for:
   - K^+ supplements K^+-sparing diuretics, e.g. amiloride and triamterene (beware combination preparations with furosemide).
   - MRAs.
   - Renin inhibitors[c].
   - NSAIDs[d].

HOW TO USE?

- Check renal function and electrolytes.
- Start with a low dose (see **Guidelines, Table 8**).
- Double the dose at not less than 2-week intervals in the community. More rapid dose uptitration may be carried out in patients in hospital or who are otherwise closely monitored, tolerability permitting.
- Aim for the target dose (see above) or, failing that, the highest tolerated dose [remember: some ACE-I (or ARB) is better than no ACE-I].
- Re-check blood chemistry (urea/BUN, creatinine, K^+) 1–2 weeks after initiation and 1–2 weeks after final dose titration.
- Monitor blood chemistry 4-monthly thereafter.
- When to stop uptitration, reduce dose, stop treatment—see PROBLEM SOLVING.
- It is very rarely necessary to stop an ACE-I (or ARB), and clinical deterioration is likely if treatment is withdrawn. Ideally, specialist advice should be sought before treatment discontinuation.
- A specialist HF nurse may assist with education of the patient, follow-up (in person or by telephone), biochemical monitoring, and dose uptitration.

Β-αναστολείς

WHY?

To improve symptoms, reduce the risk of HF hospitalization, and increase survival.

IN WHOM AND WHEN?

Indications:

1. Patients with stable HFrEF.

Contraindications:

1. Second- or third-degree AV block (in the absence of a permanent pacemaker).
2. Critical limb ischaemia.
3. Asthma (relative contraindication): if cardio-selective beta-blockers are indicated, asthma is not necessarily an absolute contraindication, but these medi cations should only be used under close medical supervision by a specialist, with consideration of the risks for and against their use; COPD is not a contraindication.
4. Known allergic reaction/other adverse reaction (drug-specific).

Cautions/seek specialist advice:

1. Severe (NYHA class IV) HF.
2. Current or recent (<4 weeks) exacerbation of HF (e.g. hospital admission with worsening HF), heart block, or heart rate <50 b.p.m.
3. If persisting signs of congestion, hypotension (SBP <90 mmHg), raised jugular venous pressure, ascites, marked peripheral oedema—try to relieve con gestion and achieve 'euvolaemia' before starting a beta-blocker.
4. Drug interactions to look out for (because of risk of bradycardia/AV block):
   - Verapamil, diltiazem (are not recommended and should be discontinued)[b].
   - Digoxin.
   - Amiodarone.
   - Ivabradine.

HOW TO USE?

- Start with a low dose in a stable condition (see **Guidelines, Table 8**).
- Double the dose at not less than 2-week intervals (slower uptitration may be needed in some patients).
- Aim for the target dose (see above) or, failing that, the highest tolerated dose (remember: some beta-blocker is better than no beta-blocker).
- Monitor heart rate, blood pressure, and clinical status (symptoms, signs—especially signs of congestion, body weight).
- A specialist HF nurse may assist with education of the patient, follow-up (in person or by telephone), and dose uptitration.
- When to stop uptitration, reduce dose, stop treatment—see PROBLEM SOLVING.

Ανταγωνιστές αλατοκορτικοειδών

e symptoms, reduce the risk of HF hospitalization, and increase survival.

M AND WHEN?

s:

with HFrEF.

dications:

allergic reaction/other adverse reaction (drug-specific).

seek specialist advice:

nt hyperkalaemia (K^+ >5.0 mmol/L)[b].

nt renal dysfunction [creatinine >221 μmol/L (>2.5 mg/dL) or eGFR <30 mL/min/1.73 m^2][b].

teractions to look out for:

supplements/K^+-sparing diuretics (e.g. amiloride and triamterene; beware combination preparations with furosemide).

E-Is/ARBs/renin inhibitors[c].

AIDs[d].

methoprim/trimethoprim-sulfamethoxazole.

w-salt' substitutes with a high K^+ content.

ong CYP3A4 inhibitors, e.g. ketoconazole, itraconazole, nefazodone, telithromycin, clarithromycin, ritonavir, and nelfinavir (when eplerenone used).

HOW TO USE?

- Check renal function and electrolytes (particularly K^+).
- Start with a low dose (see above).
- Consider dose up-titration after 4–8 weeks.
- Check blood chemistry at 1 and 4 weeks after starting/increasing dose and at 8 and 12 weeks; 6, 9, and 12 months; 4-monthly thereafter.
- If K^+ rises above 5.5 mmol/L or creatinine rises to 221 μmol/L (2.5 mg/dL)/eGFR <30 mL/min/1.73 m^2, halve a dose and monitor blood chemistry
- If K^+ rises to >6.0 mmol/L or creatinine to >310 μmol/L (3.5 mg/dL) eGFR <20 mL/min/1.73 m^2, stop MRA immediately and seek specialist advice
- A specialist HF nurse may assist with education of the patient, follow-up (in person or by telephone), biochemical monitoring, and dose up-titratio

Σακουμπιλτρίλη/βαλσαρτάνη

mptoms, reduce the risk of HF hospitalization, and increase survival.

ND WHEN?

h HFrEF as a replacement for ACE-I/ARB.

onsidered in patients with HFrEF in those who are ACE-I/ARB naïve (*de novo* use).

tions:

ngioedema.[a]

teral renal artery stenosis.

isk of pregnancy and breastfeeding period.

gic reaction/other adverse reaction (drug-specific).

mL/min/1.73 m^2.

of hypotension or a SBP <90 mmHg (PARADIGM-HF enrolled patients with SBP >95 mmHg at rando

k specialist advice:

period of at least 36 h after ACE-I therapy is required in order to minimize the risk of angioedema.

yperkalaemia (K^+ >5.0 mmol/L).

ctions to look out for:

plements/K^+-sparing diuretics, e.g. amiloride and triamterene (beware combination preparations with furosemide).

inhibitors[c].

[d].

thoprim/trimethoprim-sulfamethoxazole.

salt' substitutes with a high K^+ content.

HOW TO USE?

- Check renal function and electrolytes.
- Start with a low dose (see **Guidelines, Table 8**).
- In some patients, one may consider a reduced starting dose (24/26 mg *b.i.d.*), namely in those with SBP 100–110 mmHg, ACE-I/A eGFR 30–60 mL/min/1.73 m^2.
- Double the dose at not less than 2-week intervals in the community, monitoring tolerability.
- Aim for the target dose (see above) or, failing that, the highest tolerated dose.
- Re-check blood chemistry (urea/BUN, creatinine, K^+) 1–2 weeks after initiation and 1–2 weeks after final dose titration.
- Consider reducing diuretic where appropriate
- Monitor blood chemistry 4-monthly thereafter.
- When to stop uptitration, reduce dose, stop treatment—see PROBLEM SOLVING.
- It is very rarely necessary to stop an ARNI, and clinical deterioration is likely if treatment is withdrawn. Ideally, specialist advice sh treatment discontinuation.
- A specialist HF nurse may assist with education of the patient, follow-up (in person or by telephone), biochemical monitoring, an

Αναστολείς SGLT-2

reduce the risk of HF hospitalization, and increase survival.

WHEN?

FrEF (regardless of concomitant diabetes mellitus).

ns:

reaction/other adverse reaction (drug-specific).

of pregnancy and breastfeeding period.

nin/1.73 m^2.*

potension or a SBP <95 mmHg.

iflozin) enrolled patients with an eGFR >25 mL/min/1.73 m^2

ecialist advice:

mellitus is not an absolute contraindication, but an individual risk of ketoacidosis should be taken into account when starting this

he consequence of dapagliflozin action), may predispose to fungal genito-urinary infections

ns to look out for: Insulin, sulfonylurea derivates and other antidiabetic drugs predisposing to hypoglycaemia.

op diuretics predisposing to excessive diuresis, dehydration, symptomatic hypotension, and prerenal renal failure.

HOW TO USE?

- Check renal function when starting the therapy and monitor regularly. eGFR is known to dip slightly after initiation but the SGLT2 reno-protective
- Monitor glycaemia regularly, particularly when a patient is diabetic. Consider modification of other diabetic drugs.
- Identify the risk factors predisposing to ketoacidosis and eliminate them if possible.
- Monitor fluid balance regularly, particularly when a patient is taking diuretics, is old and/or frail. Consider an adjustment of diuretic intake.
- A specialist HF nurse may assist with education of the patient, follow-up (in person or by telephone), and biochemical monitoring.

Διουρητικά

thlessness and oedema in patients with symptoms and signs of congestion.

ND WHEN?

ll patients with symptoms and signs of congestion, irrespective of LVEF.

should always be used in a combination with an ACE-I (or an ARB), a beta-blocker, and an MRA in patients with HFrEF (unless any of these tolerated/contraindicated), until signs of congestion have been relieved.

retics can be used in patients with preserved renal function and mild symptoms of congestion. However, the majority of patients require cs (or combined with a thiazide diuretic and an MRA) due to the severity of HF symptoms and steadily deteriorating kidney function.

tions:

ed if the patient has never had symptoms or signs of congestion.

gic reaction/other adverse reaction (drug-specific).

k specialist advice:

ypokalaemia ($K^+ \leq 3.5$ mmol/L)—may be made worse by diuretic.

enal dysfunction [creatinine >221 μmol/L (>2.5 mg/dL) or eGFR <30 mL/min/1.73 m^2]—may be made worse by diuretic or patient may not diuretic (especially thiazide diuretic).

c or severe asymptomatic hypotension (SBP <90 mmHg)—may be made worse by diuretic-induced hypovolaemia.

ctions to look out for:

ion with an ACE-I, an ARB, or a renin inhibitor[a]—risk of hypotension (usually not a problem).

ion with other diuretics (e.g. loop plus thiazide)—risk of hypovolaemia, hypotension, hypokalaemia, and renal impairment[b].

—may attenuate effect of diuretic.

RETIC AND WHAT DAILY DOSE?

s:

starting dose 20–40 mg, usual dose 40–240 mg.

starting dose 0.5–1 mg, usual dose 1–5 mg.

starting dose 5–10 mg, usual dose 10–20 mg.

azide-like diuretics:

ethiazide: starting dose 2.5 mg, usual dose 2.5–10 mg.

othiazide: starting dose 25 mg, usual dose 12.5–100 mg.

starting dose 2.5 mg, usual dose 2.5–10 mg. Can be weekly, daily, or prn.

sulfonamide:

starting dose 2.5 mg, usual dose 2.5–5 mg.

HOW TO USE?

- Check renal function and electrolytes, particularly in those on a combination of loop and thiazide diuretics.
- Start with a low dose but target an effective dose for a patient to achieve positive diuresis with a simultaneous reduction of bo per day.
- Adjust a dose according to symptoms and/or signs of congestion, blood pressure, and renal function. Use a minimum dose nec euvolaemia—the patient's 'dry weight' (i.e. to keep the patient free of symptoms and signs of congestion).
- Dose may need to be increased or decreased according to the patient's volume status (remember that excessive diuresis is more itself).
- Re-check blood chemistry 1–2 weeks after an initiation and after any increase in dose (urea/BUN, creatinine, K^+).
- When to stop uptitration, reduce dose, stop treatment—see PROBLEM SOLVING.
- Patients can be educated to alter their own diuretic dose, according to need (based on symptoms, signs, and weight changes).
- A specialist HF nurse may assist with education of the patient, follow-up (in person or by telephone), biochemical monitoring, (including patient educated in dose adjustment).

ence-based doses of disease-modifying drugs in key randomized s in patients with heart failure with reduced ejection fraction (1)

	Starting dose	Target dose
opril[c]	6.25 mg *t.i.d.*	50 mg *t.i.d.*
pril	2.5 mg *b.i.d.*	10–20 mg *b.i.d.*
opril[b]	2.5–5 mg *o.d.*	20–35 mg *o.d.*
pril	2.5 mg *b.i.d.*	5 mg *b.i.d.*
lolapril[a]	0.5 mg *o.d.*	4 mg *o.d.*
bitril/valsartan	49/51 mg *b.i.d.*[c]	97/103 mg *b.i.d.*

giotensin-converting enzyme inhibitor; ARNI = angiotensin receptor–neprilysin inhibitor; b.i.d. = bis in die; o.d. = omne in die (once daily); t.i.d. = ter in die (three times a day).
an ACE-I where the dosing target is derived from post-myocardial infarction trials.
drugs where a higher dose has been shown to reduce morbidity/mortality compared with a lower dose of the same drug, but there is no substantive randomized, placebo-l trial and the optimum dose is uncertain. [c]Sacubitril/valsartan may have an optional lower starting dose of 24/26 mg b.i.d. for those with a history of symptomatic hypotension.

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ence-based doses of disease-modifying drugs in key randomized s in patients with heart failure with reduced ejection fraction (2)

	Starting dose	Target dose
blockers		
rolol	1.25 mg *o.d.*	10 mg *o.d.*
dilol	3.125 mg *b.i.d.*	25 mg *b.i.d.*[e]
prolol succinate (CR/XL)	12.5–25 mg *o.d.*	200 mg *o.d.*
olol[d]	1.25 mg *o.d.*	10 mg *o.d.*
erone	25 mg *o.d.*	50 mg *o.d.*
nolactone	25 mg *o.d.*[f]	50 mg *o.d.*

in die (twice daily); CR= controlled release; MRA = mineralocorticoid receptor antagonist; o.d. = omne in die (once daily); XL = extended release.
a treatment not shown to reduce CV or all-cause mortality in patients with heart failure (or shown to be non-inferior to a treatment that does).
um dose of 50 mg twice daily can be administered to patients weighing over 85 kg.
ctone has an optional starting dose of 12.5 mg in patients where renal status or hyperkalaemia warrant caution.

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ence-based doses of disease-modifying drugs in key randomized s in patients with heart failure with reduced ejection fraction (3)

	Starting dose	Target dose
2 inhibitor		
gliflozin	10 mg *o.d.*	10 mg *o.d.*
agliflozin	10 mg *o.d.*	10 mg *o.d.*
er agents		
esartan	4 mg *o.d.*	32 mg *o.d.*
rtan	50 mg *o.d.*	150 mg *o.d.*
rtan	40 mg *b.i.d.*	160 mg *b.i.d.*

in die (twice daily); o.d. = omne in die (once daily); SGLT2 = sodium-glucose co-transporter 2; t.i.d. = ter in die (three times a day.

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er pharmacological treatments indicated in selected patients with A class II-IV heart failure with reduced ejection fraction (LVEF ≤40%) (2)

mmendations	Class	Level
nnel inhibitor		
adine should be considered in symptomatic patients with LVEF ≤35%, in SR and a g heart rate ≥70 b.p.m. despite treatment with an evidence-based dose of beta-er (or maximum tolerated dose below that), ACE-I/(or ARNI), and an MRA, to ce the risk of HF hospitalization and CV death.	IIa	B
adine should be considered in symptomatic patients with LVEF ≤35%, in SR and a g heart rate ≥70 b.p.m. who are unable to tolerate or have contraindications for a blocker to reduce the risk of HF hospitalization and CV death. Patients should also ve an ACE-I (or ARNI) and an MRA.	IIa	C

giotensin-converting enzyme inhibitor; ARNI = angiotensin receptor-neprilysin inhibitor; b.p.m. = beats per minute; CV = cardiovascular; HF = heart failure; t ventricular ejection fraction; MRA = mineralocorticoid receptor antagonist; NYHA = New York Heart Association; SR = sinus rhythm.

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Ιβαβραδίνη

WHY?

To reduce the risk of HF hospitalization and CV death.

IN WHOM AND WHEN?

Indications:

1. Patients with stable symptomatic HF (NYHA class II–IV) and an EF ≤35% SR and resting heart rate ≥70 b.p.m. despite guideline-recommended treatment (in particular, an evidence-based dose of beta-blocker).

Contraindications:

1. Unstable CV conditions (ACS, stroke/TIA, severe hypotension).
2. AF.
3. Severe liver dysfunction or renal dysfunction (no evidence on safety or pharmacokinetics for creatinine clearance <15 mL/min).
4. Pregnancy or breastfeeding.
5. Known allergic reaction/other adverse reaction (drug-specific).

Cautions/seek specialist advice:

1. Severe (NYHA class IV) HF.
2. Current or recent (<4 weeks) exacerbation of HF (e.g. hospital admission with worsening HF).
3. Resting heart rate <50 b.p.m. during treatment.
4. Moderate liver dysfunction.
5. Chronic retinal diseases, including retinitis pigmentosa.
6. Drug interactions:
   - To look out for (due to a potential risk of bradycardia and an induction of long QT as a result of bradycardia):
     - Verapamil, diltiazem (both should be discontinued/not used in HFrEF).
     - Digoxin.
     - Amiodarone.
   - To look out for drugs being strong inhibitors of isoenzyme CYP3A4:
     - Antifungal azoles (such as ketoconazole, itraconazole).
     - Macrolide antibiotics (such as clarithromycin, erythromycin).
     - HIV protease inhibitors (nelfinavir, ritonavir).
     - Nefazodone.

er pharmacological treatments indicated in selected patients with A class II-IV heart failure with reduced ejection fraction (LVEF ≤40%) (3)

mmendations	Class	Level
le guanylate cyclase stimulator		
iguat may be considered in patients in NYHA class II-IV who have had worsening HF te treatment with an ACE-I (or ARNI), a beta-blocker and an MRA to reduce the f CV mortality or HF hospitalization.	IIb	B
alazine and isosorbide dinitrate		
alazine and isosorbide dinitrate should be considered in self-identified black nts with LVEF ≤35% or with an LVEF <45% combined with a dilated left ventride in A class III-IV despite treatment with an ACE-I (or ARNI), a beta-blocker and an MRA duce the risk of HF hospitalization and death.	IIa	B
alazine and isosorbide dinitrate may be considered in patients with symptomatic F who cannot tolerate any of an ACE-I, an ARB, or ARNI (or they are aindicated) to reduce the risk of death.	IIb	B

giotensin-converting enzyme inhibitor; ARNI = angiotensin receptor-neprilysin inhibitor; CV = cardiovascular; HF = heart failure; LVEF = left ventricular ejection fraction; neralocorticoid receptor antagonist; NYHA = New York Heart Association.

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er pharmacological treatments indicated in selected patients with A class II-IV heart failure with reduced ejection fraction (LVEF ≤40%) (4)

mmendations	Class	Level
tin		
tin may be considered in patients with symptomatic HFrEF in sinus rhythm despite ment with an ACE-I (or ARNI), a beta-blocker and an MRA, to reduce the risk of talization (both all-cause and HF hospitalizations).	IIb	B

giotensin-converting enzyme inhibitor; ARNI = angiotensin receptor-neprilysin inhibitor; HF = heart failure; HFrEF = heart failure with reduced ejection fraction; MRA = corticoid receptor antagonist.

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ence-based doses of disease-modifying drugs in key randomized s in patients with heart failure with reduced ejection fraction (3)

	Starting dose	Target dose
adine	5 mg *b.i.d.*	7.5 mg *b.i.d.*
iguat	2.5 mg *o.d.*	10 mg *o.d.*

in die (twice daily); o.d. = omne in die (once daily); SGLT2 = sodium-glucose co-transporter 2; t.i.d. = ter in die (three times a day.

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ence-based doses of disease-modifying drugs in key randomized s in patients with heart failure with reduced ejection fraction (3)

	Starting dose	Target dose
er agents (continued)		
xin	62.5 µg *o.d.*	250 µg *o.d.*
alazine/ Isosorbide dinitrate	37.5 mg *t.i.d.*/ 20 mg *t.i.d.*	75 mg *t.i.d.*/ 40 mg *t.i.d.*

: in die (twice daily); o.d. = omne in die (once daily); SGLT2 = sodium-glucose co-transporter 2; t.i.d. = ter in die (three times a day.

ommendations for an implantable cardioverter-defibrillator in ents with heart failure (1)

mmendations	Class	Level
ndary prevention		
CD is recommended to reduce the risk of sudden death and all-cause ality in patients who have recovered from a ventricular arrhythmia causing nodynamic instability, and who are expected to survive for >1 year with good ional status, in the absence of reversible causes or unless the ventricular rthmia has occurred <48 h after a MI.	I	A
ary prevention		
CD is recommended to reduce the risk of sudden death and all-cause ality in patients with symptomatic HF (NYHA class II-III) of an ischaemic logy (unless they have had a MI in the prior 40 days–see below), and an LVEF % despite ≥3 months of OMT, provided they are expected to survive cantially longer than 1 year with good functional status.	I	A

t failure; ICD = implantable cardioverter-defibrillator; LVEF = left ventricular ejection fraction; MI = myocardial infarction; NYHA = New York Heart Association; OMT = optimal herapy.

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ommendations for an implantable cardioverter-defibrillator in ents with heart failure (2)

mmendations	Class	Level
ary prevention (continued)		
CD should be considered to reduce the risk of sudden death and all-cause ality in patients with symptomatic HF (NYHA class II-III) of a non-ischaemic logy, and an LVEF ≤35% despite ≥3 months of OMT, provided they are cted to survive substantially longer than 1 year with good functional status.	IIa	A
nts should be carefully evaluated by an experienced cardiologist before rator replacement, because management goals, the patient's needs and cal status may have changed.	IIa	B
arable ICD may be considered for patients with HF who are at risk of sudden ac death for a limited period or as a bridge to an implanted device.	IIb	B

t failure; ICD = implantable cardioverter-defibrillator; LVEF = left ventricular ejection fraction; NYHA = New York Heart Association; OMT = optimal medical therapy.

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ommendations for cardiac resynchronization therapy implantation in ents with heart failure (1)

mmendations	Class	Level
s recommended for symptomatic patients with HF in SR with a QRS duration ms and LBBB QRS morphology and with LVEF ≤35% despite OMT in order to ove symptoms and reduce morbidity and mortality.	I	A
should be considered for symptomatic patients with HF in SR with a QRS tion of 130–149 ms and LBBB QRS morphology and with LVEF ≤35% despite in order to improve symptoms and reduce morbidity and mortality.	IIa	B
should be considered for symptomatic patients with HF in SR with a QRS tion ≥150 ms and non-LBBB QRS morphology and with LVEF ≤35% despite in order to improve symptoms and reduce morbidity and mortality.	IIa	B
may be considered for symptomatic patients with HF in SR with a QRS duration 0–149 ms and non-LBBB QRS morphology and with LVEF ≤35% despite OMT in r to improve symptoms and reduce morbidity and mortality.	IIb	B

fibrillation; AV = atrio-ventricular; CRT = cardiac resynchronization therapy; HF = heart failure; HFrEF = heart failure with reduced ejection fraction; ICD = implantable cardioverter-defibrillator; LBBB = left anch block; LVEF = left ventricular ejection fraction; NYHA= New York Heart Association; OMT= optimal medical therapy (class I recommended medical therapies for at least 3 months); QRS = Q, R, and S in ECG; RV = right ventricular; SR = sinus rhythm.

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ommendations for the treatment of atrial fibrillation in patients heart failure (1)

mmendations	Class	Level
coagulation		
-term treatment with an oral anticoagulant is recommended in all patients AF, HF, and CHA_2DS_2-VASc score ≥2 in men or ≥3 in women.	I	A
Cs are recommended in preference to VKAs in patients with HF, except in e with moderate or severe mitral stenosis or mechanical prosthetic heart s.	I	A
-term treatment with an oral anticoagulant should be considered for stroke ention in AF patients with a CHA_2DS_2-VASc score of 1 in men or 2 in women.	IIa	B
control		
-blockers should be considered for short and long-term rate control in nts with HF and AF.	IIa	B
xin should be considered when the ventricular rate remains high, despite -blockers, or when beta-blockers are contraindicated or not tolerated.	IIa	C

fibrillation; CHA_2DS_2-VASc = congestive heart failure or left ventricular dysfunction, Hypertension, Age ≥ 75 (doubled), Diabetes, Stroke (doubled)-Vascular disease, Age 65–74, Sex (female) (score); DOAC = direct acting oral anticoagulant; HF = heart failure; MT = medical therapy; VKA = vitamin K antagonist.

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ommendations for the treatment of atrial fibrillation in patients heart failure (2)

mmendations	Class	Level
ioversion		
nt ECV is recommended in the setting of acute worsening of HF in patients enting with rapid ventricular rates and haemodynamic instability.	I	C
ioversion may be considered in patients in whom there is an association een AF and worsening of HF symptoms despite optimal medical treatment	IIb	B
atheter ablation		
ses of a clear association between paroxysmal or persistent AF and worsening F symptoms, which persist despite MT, catheter ablation should be considered he prevention or treatment of AF.	IIa	B

l fibrillation; ECV = electrical cardioversion; HF = heart failure; MT = medical therapy.

ommendations for myocardial revascularization in patients with rt failure with reduced ejection fraction (1)

mmendations	Class	Level
nary revascularization should be considered to relieve persistent symptoms gina (or an angina-equivalent) in patients with HFrEF, CCS, and coronary omy suitable for revascularization, despite OMT including anti-anginal drugs.	IIa	C
nary revascularization may be considered to improve outcomes in patients HFrEF, CCS, and coronary anatomy suitable for revascularization, after careful uation of the individual risk to benefit ratio, including coronary anatomy (i.e. mal stenosis >90% of large vessels, stenosis of left main or proximal LAD), orbidities, life expectancy, and patient's perspectives.	IIb	C
AD candidates needing coronary revascularization, CABG should be avoided, ssible.	IIa	C

oronary artery bypass graft; CCS = chronic coronary syndrome; HFrEF = heart failure with reduced ejection fraction; LAD = left anterior descending artery; LVAD = left ventricular ice; OMT= optimal medical therapy

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ommendations for myocardial revascularization in patients with rt failure with reduced ejection fraction (2)

mmendations	Class	Level
G should be considered as the first-choice revascularization strategy, in ents suitable for surgery, especially if they have diabetes and for those with ivessel disease.	IIa	B
nay be considered as an alternative to CABG, based on Heart Team uation, considering coronary anatomy, comorbidities, and surgical risk.	IIb	C

oronary artery bypass graft; PCI = percutaneous coronary intervention.

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ommendations for the management of valvular heart disease in ents with heart failure (2)

mmendations	Class	Level
ndary mitral regurgitation		
tients with HF, severe secondary mitral regurgitation and CAD who need scularization, CABG and mitral valve surgery should be considered.	IIa	C
utaneous edge-to-edge mitral valve repair should be considered in carefully ted patients with secondary mitral regurgitation, not eligible for surgery and eeding coronary revascularization, who are symptomatic[a] despite OMT and fulfil criteria[b] for achieving a reduction in HF hospitalizations.	IIa	B
utaneous edge-to-edge mitral valve repair may be considered to improve toms in carefully selected patients with secondary mitral regurgitation, not le for surgery and not needing coronary revascularization, highly tomatic despite OMT and who do not fulfil criteria for reducing HF italization.	IIb	C

oronary artery bypass graft; CAD= coronary artery disease; OMT= optimal medical therapy; SAVR = surgical aortic valve replacement. [a]NYHA class III-IV. [b]All of the following criteria ulfilled: LVEF 20–50%, LVESD <70 mm, systolic pulmonary pressure <70 mm Hg, absence of moderate or severe right ventricular dysfunction or severe TR, absence of haemodynamic

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ommendations for anaemia and iron deficiency in patients with rt failure

mmendations	Class	Level
ecommended that all patients with HF be periodically screened for anaemia and deficiency with a full blood count, serum ferritin concentration, and TSAT.	I	C
venous iron supplementation with ferric carboxymaltose should be considered in tomatic patients with LVEF <45% and iron deficiency, defined as serum ferritin ng/mL or serum ferritin 100–299 ng/mL with TSAT <20%, to alleviate HF toms, improve exercise capacity and QOL.	IIa	A
venous iron supplementation with ferric carboxymaltose should be considered in tomatic HF patients recently hospitalized for HF and with LVEF <50% and iron ency, defined as serum ferritin <100 ng/mL or serum ferritin 100–299 ng/mL with <20%, to reduce the risk of HF hospitalization.	IIa	B

t failure; LVEF = left ventricular ejection fraction; QOL = quality of life; TSAT = transferrin saturation.

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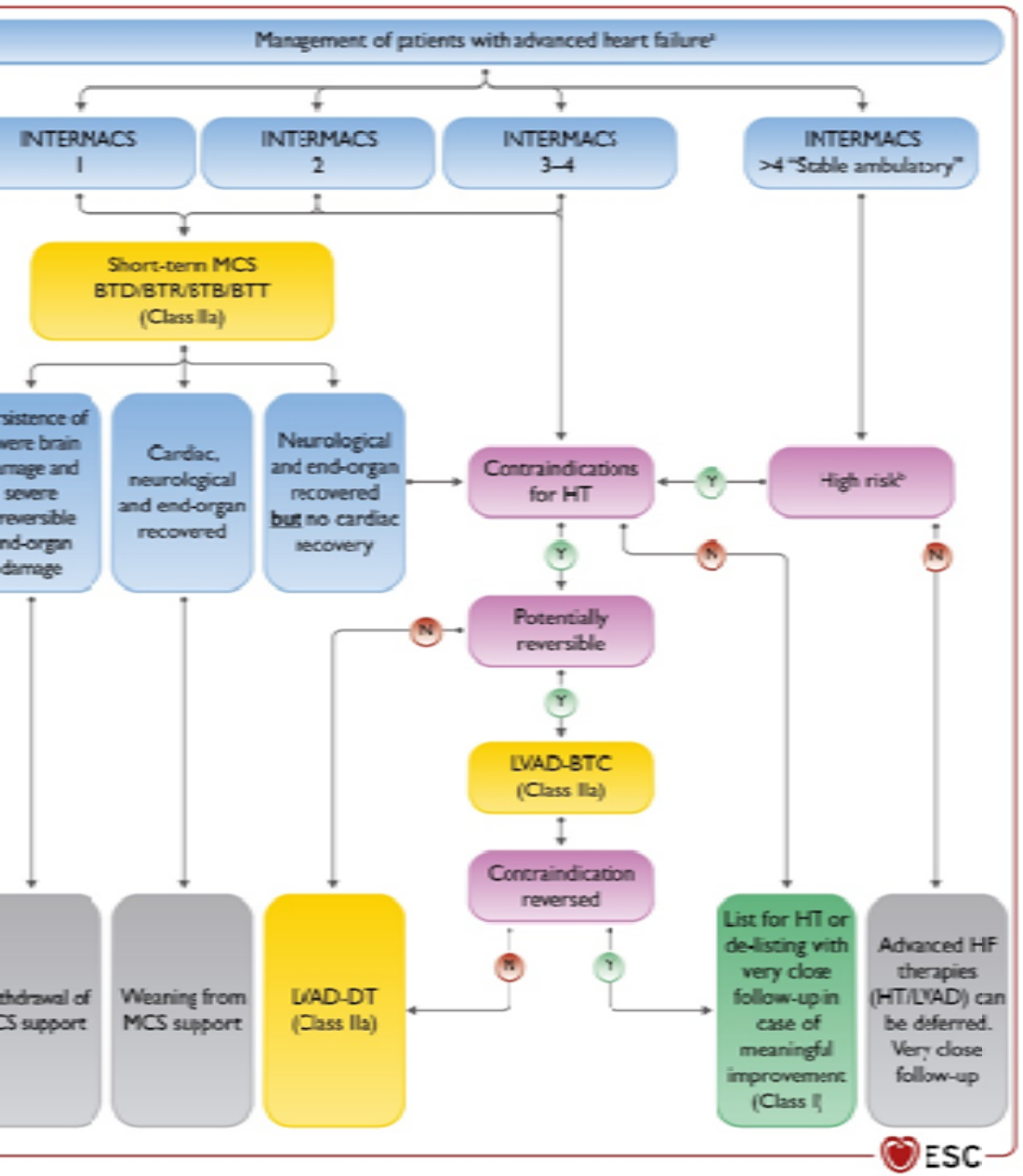

Algorithm for the treatment of patients with advanced heart failure

BTB = bridge to bridge; BTC=bridge to candidacy; BTD = bridge to decision; BTR = bridge to recovery; BTT = bridge to transplantation; CA = cardiac amyloidosis; DT = destination therapy; ESC = European Society of Cardiology; HCM = hypertrophic cardiomyopathy; HF = heart failure; HFA = Heart Failure Association; HT = heart transplantation; INTERMACS = Interagency Registry for Mechanically Assisted Circulatory Support; LVAD = left ventricular assist device; LVAD-BTC = left ventricular assist device bridge to candidacy; LVAD-DT = left ventricular assist device destination therapy; MCS = mechanical circulatory support.

[a]This algorithm can be applied to all patients with advanced HF defined according to the ESC/HFA criteria, with exception of HCM, CA, arrhythmic storm, adult congenital heart disease, refractory angina.

[b]Recurrent hospitalization, progressive end-organ failure, refractory congestion, inability to perform cardiopulmonary exercise test or peak oxygen consumption <12 mL/min/kg or <50% of expected value.

Colour code for classes of recommendations: Green for Class of recommendation I and Yellow for Class of recommendation IIa (see Table 1 for further details on classes of recommendation

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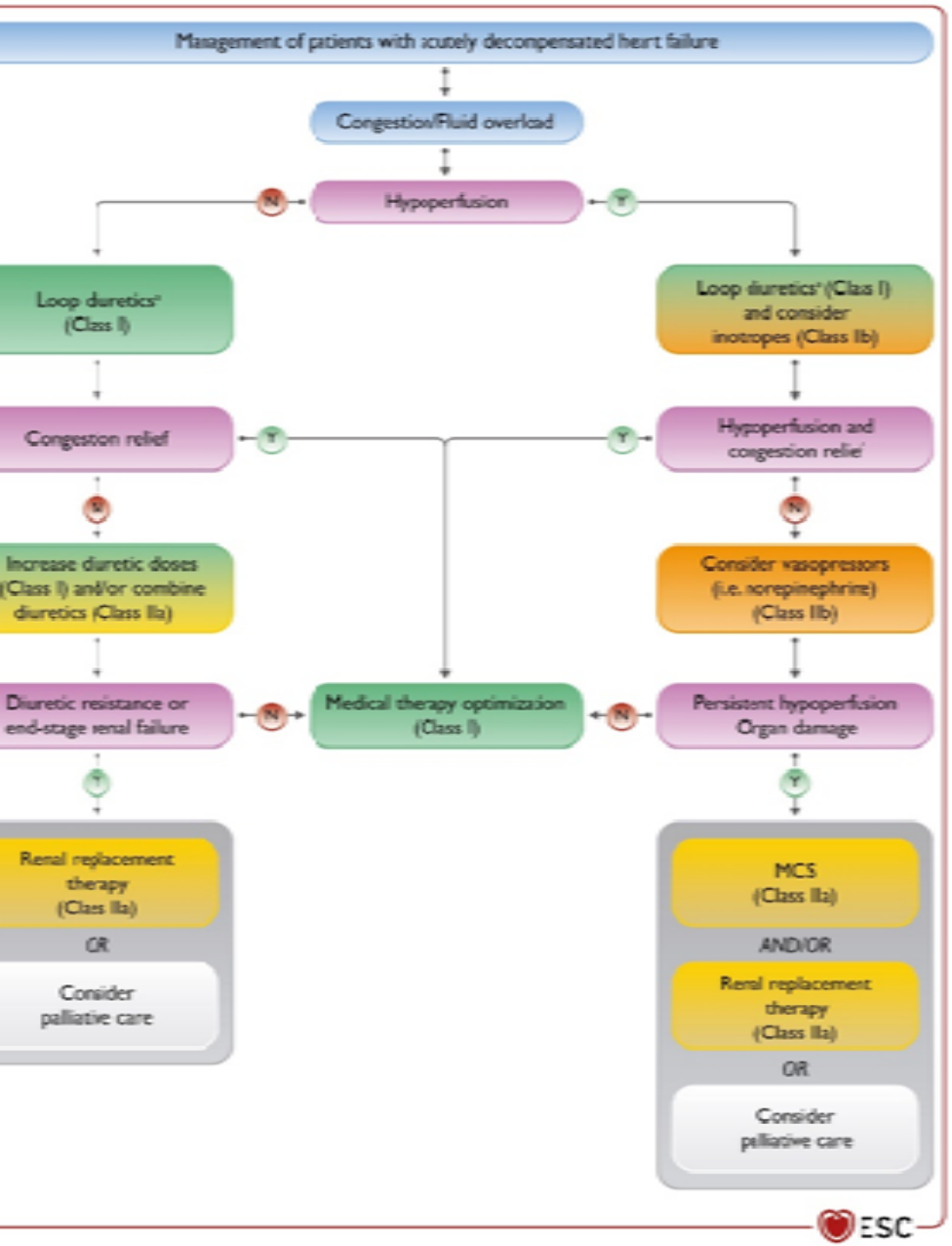
ΟΞΕΙΑ ΚΑΡΔΙΑΚΗ ΑΝΕΠΑΡΚΕΙΑ

Management of acute decompensated heart failure



MCS=mechanical circulatory support.
[a]Adequate diuretic doses to relieve congestion and close monitoring of diuresis is recommended (see Figure13) regardless of perfusion status.

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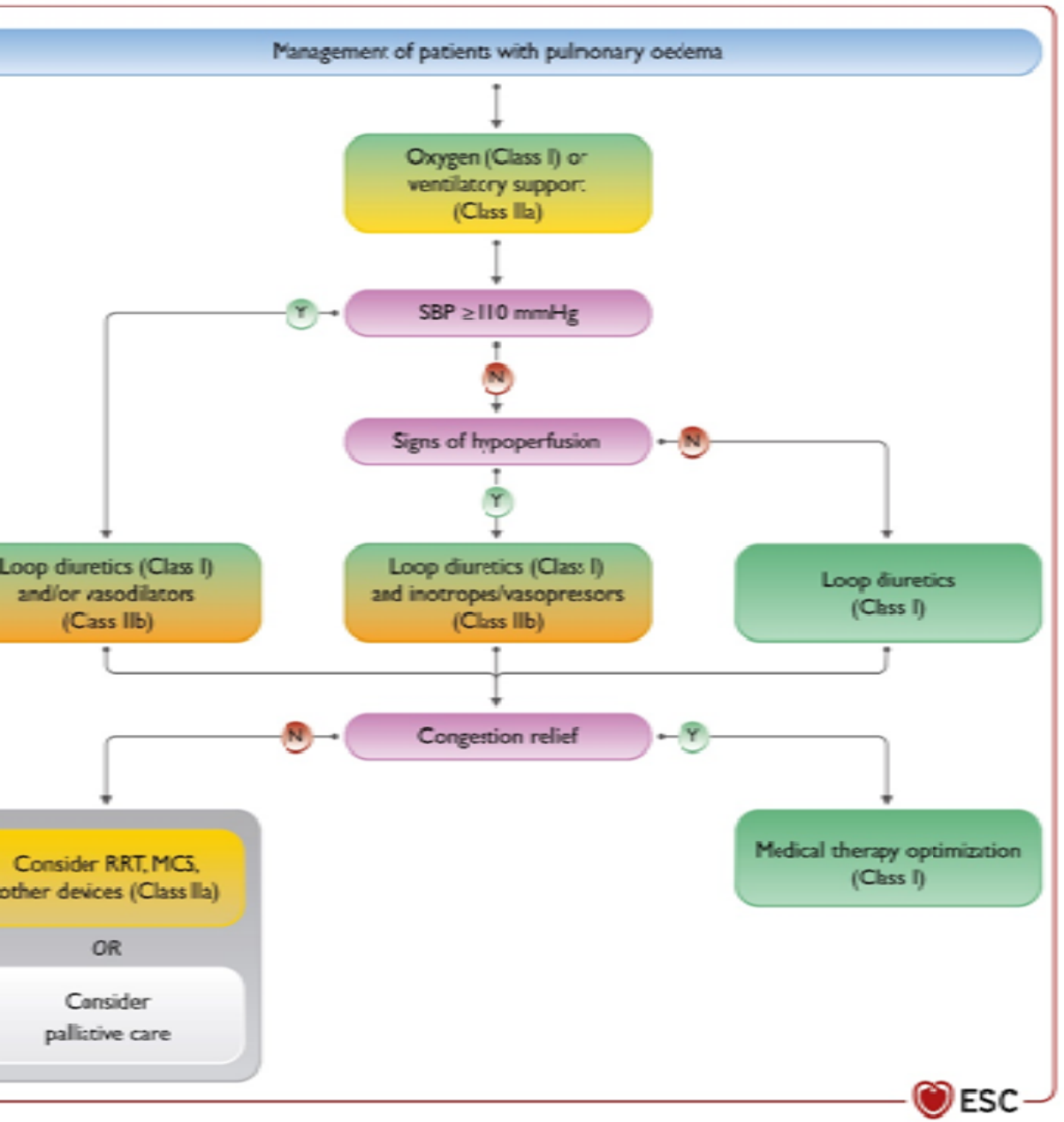
Management of pulmonary oedema



MCS=mechanical circulatory support; RRT= renal replacement therapy; SBP=systolic blood pressure.

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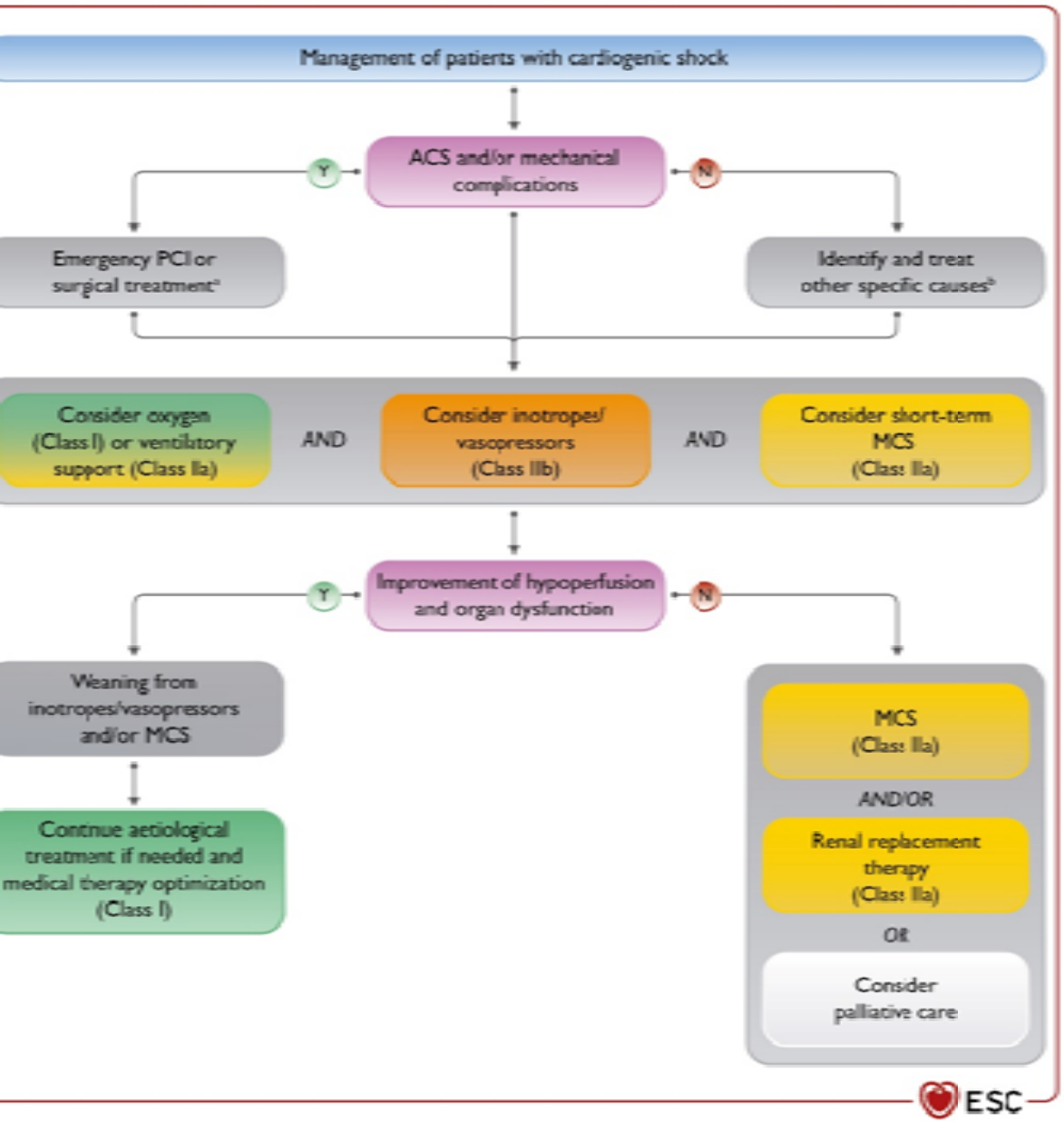

Management of cardiogenic shock

ACS = acute coronary syndrome; BTT = bridge to transplantation; MCS = mechanical circulatory support; PCI = percutaneous coronary intervention.

[a]PCI in ACS, pericardiocentesis in tamponade, mitral valve surgery in papillary muscle rupture. In case of interventricular septum rupture, MCS as BTT should be considered.

[b]Other causes include acute valve regurgitation, pulmonary embolism, infection, acute myocarditis, arrhythmia.

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ommendations for the initial treatment of acute heart failure (1)

mmendations	Class	Level
gen and ventilatory support		
en is recommended in patients with SpO_2 <90% or PaO_2 <60 mmHg to ect hypoxaemia.	I	C
ation is recommended for progressive respiratory failure persisting in spite of en administration or non-invasive ventilation.	I	C
invasive positive pressure ventilation should be considered in patients with ratory distress (respiratory rate >25 breaths/min, SpO_2 <90%) and started as as possible in order to decrease respiratory distress and reduce the rate of hanical endotracheal intubation.	IIa	B

rtial pressure of oxygen; SpO_2=transcutaneous oxygen saturation.

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ommendations for the initial treatment of acute heart failure (2)

mmendations	Class	Level
etics		
venous loop diuretics are recommended for all patients with AHF admitted signs/symptoms of fluid overload to improve symptoms.	I	C
oination of a loop diuretic with thiazidetype diuretic should be considered in nts with resistant oedema who do not respond to an increase in loop diuretic s.	IIa	B
dilators		
tients with AHF and SBP >110 mmHg, i.v. vasodilators may be considered as l therapy to improve symptoms and reducecongestion.	IIb	B

te heart failure; i.v. = intravenous; SBP = systolic blood pressure.

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ommendations for the initial treatment of acute heart failure (3)

mmendations	Class	Level
opic agents		
opic agents may be considered in patients with SBP <90 mmHg and evidence poperfusion who do not respond to standard treatment, including fluid enge, to improve peripheral perfusion and maintain end-organ function.	IIb	C
opic agents are not routinely recommended, due to safety concerns, unless atient has symptomatic hypotension and evidence of hypoperfusion.	IIa	B
pressors		
opressor, preferably norepinephrine, may be considered in patients with ogenic shock to increase blood pressure and vital organ perfusion.	IIb	B

olic blood pressure.

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ommendations for the initial treatment of acute heart failure (3)

mmendations	Class	Level
r drugs		
mboembolism prophylaxis (e.g. with LMWH) is recommended in patients not dy anticoagulated and with no contraindication to anticoagulation, to reduce isk of deep venous thrombosis and pulmonary embolism.	I	A
ine use of opiates is not recommended, unless in selected patients with re/intractable pain or anxiety.	III	C

ow-molecular-weight heparin.

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ommendations for the use of short-term mechanical circulatory port in patients with cardiogenic shock

mmendations	Class	Level
t-term MCS should be considered in patients with cardiogenic shock as a BTR, BTB. Further indications include treatment of the cause of cardiogenic shock ng-term MCS or transplantation.	IIa	C
may be considered in patients with cardiogenic shock as a BTR, BTD, BTB, ding treatment of the cause of cardiogenic shock (i.e. hanical complication of acute MI) or longterm MCS or transplantation.	IIb	C
is not routinely recommended in post-MI cardiogenic shock.	III	B

lge to bridge; BTD = bridge to decision; BTR = bridge to recovery; IABP = intra-aortic balloon pump; MCS = mechanical circulatory support; MI = myocardial infarction.

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ommendations for pre-discharge and early post-discharge follow-up atients hospitalized for acute heart failure

mmendations	Class	Level
ecommended that patients hospitalized for HF be carefully evaluated to de persistent signs of congestion before discharge and to optimize oral ment	I	C
ecommended that evidence-based oral medical treatment be administered re discharge.	I	C
arly follow-up visit is recommended at 1-2 weeks after discharge to assess of congestion, drug tolerance and start and/or uptitrate evidence-based py.	I	C
c carboxymaltose should be considered for iron deficiency, defined as serum in <100 ng/mL or serum ferritin 100–299 ng/mL with TSAT <20%, to improve toms and reduce rehospitalizations.	IIa	B

t failure; TSAT = transferrin saturation.

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