

CLINICAL GUIDELINE

Heart Failure, Heart MCN Guidelines for the Investigation and Management of Heart Failure

A guideline is intended to assist healthcare professionals in the choice of disease-specific treatments.

Clinical judgement should be exercised on the applicability of any guideline, influenced by individual patient characteristics. Clinicians should be mindful of the potential for harmful polypharmacy and increased susceptibility to adverse drug reactions in patients with multiple morbidities or frailty.

If, after discussion with the patient or carer, there are good reasons for not following a guideline, it is good practice to record these and communicate them to others involved in the care of the patient.

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NHSGGC Guidelines For The Investigation and Management of

Heart Failure

This document can be accessed online at <http://www.nhsggc.org.uk/about-us/professional-support-sites/heart-stroke-diabetes-rheumatology-and-chronic-pain-mcns/heart-disease/guidelines-and-protocols/>

Suspicion of 'new' Heart Failure?

Existing Known Heart Failure?

Essential investigations

- BNP or NT-proBNP blood tests
- Ctrl & Click for detailed info on other Essential investigation

If suspected heart failure refer as per Heart Failure Diagnostic pathway
<http://live.nhsggc.org.uk/media/246665/heart-failure-diagnostic-pathway-dec-2017.pdf>

EMIS /VISION coding (read codes)

If HF due to LVSD is confirmed please ensure patient is coded:

- 'Heart Failure' G58
- 'Echo shows LVSD' 585f

Treatment

- ACE Inhibitors or ARB (max tolerated dose) unless contraindicated- Ctrl & Click for info Treatment- ACE inhibitors (ACEI) & Treatment - Angiotensin receptor blockers (ARB)
- Beta Blockers (max tolerated dose) unless contraindicated- Ctrl & Click for info Treatment- Beta blockers
- Loop diuretic (to alleviate symptoms) - Ctrl & Click for info Treatment – Loop diuretic
- Lifestyle advice – Ctrl and click Treatment- Lifestyle changes

NO

IS PATIENT STILL SYMPTOMATIC?

YES

Usual Annual Care

Ctrl & Click for info Recommendations for Usual Annual Care

Monitor:

- NYHA
- Check for fluid overload (e.g. peripheral oedema, PND / orthopnea)
- Pulse rate and rhythm
- Medication compliance
- Lifestyle
- U&E (including Near-Patient-Testing LES)

Treatment

- Loop diuretic can be increased up to maximum dose of Furosemide 120mg (or equivalent)
- Ctrl & Click for info Treatment – Loop diuretic

IS PATIENT STILL SYMPTOMATIC?

NO

YES

Patient

- Symptomatic with no previous HF nurse involvement? OR
- Worsening symptoms and previously known to HF nurses? OR
- Admitted to hospital in last year with worsening HF but without cardiology / HF nurse input?

Refer to General Cardiology or re-refer to the Heart Failure Nurse service if patient is already known to service

- Ctrl & Click for Heart failure nurse service contact details
- Ctrl & Click for Further Management– Other heart failure treatment options (under specialist guidance only)

1. Essential investigation

If patient symptoms and /or signs suggest heart failure and/or LVSD check:

- BNP or NTproBNP blood tests (BNP level < 100 nanograms/L or NT-proBNP < 400 nanograms/L)
- FBC (Anaemia may cause breathlessness)
- If new symptoms of breathlessness are present a CXR should be performed (if not performed within preceding 6 months). CXR May show suspicion of heart failure or show lung disease.
- Blood glucose (high prevalence of diabetes in LVSD (any cause)
- TFTs (hypothyroidism may cause heart failure)
- Blood Chemistry (renal function pre ACE-I)
- Echocardiogram (use heart failure diagnostic pathway, this will incorporate ECG and/or BNP)
- Serum albumin to exclude nephritic syndrome

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2. Treatment- ACE inhibitors (ACEI)

Who: All patients with LVSD regardless of symptoms

Why: Improves symptoms and prognosis in all grades of heart failure.

General advice: Begin at lowest dose and up-titrate to maximum tolerated dose

Target doses: Ramipril 5mg twice daily (or 10mg once daily), lisinopril 30-35mg once daily or enalapril 10-20mg twice daily.

Monitoring: U&E must be checked at one week following initiation and each up titration to assess renal function.

Troubleshooting:

- If renal function deteriorating (decrease in GFR of >30%), consider stopping ACEI and seek specialist advice.
- If serum potassium level is >5.5 and <6 reduce the ACEI dose by 50% and recheck in a week, if the serum potassium level is >6 stop ACEI and seek specialist advice
- If ACEI is not tolerated due to persistent dry cough substitute with an angiotensin receptor blocker (ARB) licensed for use in heart failure (see below)

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3. Treatment - Angiotensin receptor blockers (ARB)

Who: For patients intolerant of ACEI due to side effects (most commonly persistent dry cough) OR as add on therapy in patients with ongoing symptoms in spite of ACEI and beta-blocker and intolerant of mineralocorticoid receptor antagonists (under specialist guidance only)

Why: Improves symptoms and prognosis in all grades of heart failure.

General advice: Begin at lowest dose and up-titrate to maximum tolerated dose

Target doses: Candesartan 32 mg once daily, Valsartan 160mg twice daily (post MI heart failure only)

Monitoring: If on monotherapy use the same monitoring as per ACE-I. If on dual therapy (i.e. ACEI AND ARB) then use the same monitoring as per mineralocorticoid receptor antagonist (see below MRA section)

Troubleshooting: Same as ACEI

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4. Treatment- Beta blockers

Who: All patients with LVSD regardless of symptoms should be started on beta-blocker therapy **as soon as their condition is stable** i.e. free from decompensated heart failure (unless contraindicated by a history of asthma or heart block)

Why: Improves symptoms and prognosis in all grades of heart failure.

General advice: Begin at lowest dose and up-titrate slowly at intervals of not less than two weeks to maximum tolerated dose. Beta –blocker treatment should be prescribed under the guidance of a health professional experienced in the management of heart failure. **Diltiazem or verapamil must be discontinued.**

Target doses: Carvedilol 25mg twice daily (50mg twice daily if ≥85kgs), bisoprolol 10mg once daily, nebivolol 10mg once daily. NB- Nebivolol is restricted to use only in those ≥70 years who are intolerant of both carvedilol and bisoprolol and only on the advice of an expert.

Troubleshooting: Do not increase dose if heart rate ≤ 50bpm or systolic blood pressure ≤90mmHg.

Other advice: Patients stabilised on another beta- blocker (for e.g. CHD or hypertension), consider substituting if clinically appropriate and patients heart failure condition is stable:

<i>Current Dose of Atenolol</i>	<i>Approx. Equivalent Dose of Bisoprolol</i>	<i>Approx. Equivalent Dose of Carvedilol</i>
25mg daily	1.25 – 2.5mg daily	6.25mg twice daily
50mg daily	2.5 - 5mg daily	12.5mg twice daily
>50 mg daily	5 - 10mg daily	12.5 - 25mg twice daily

Seek specialist advice if unsure. Equivalent dose chosen should be individualised, after assessment of heart rate and blood pressure. Review heart rate, blood pressure and clinical symptoms ideally 1 week after substitution. Optimise dose according to response, including heart rate.

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5. Treatment – Loop diuretic

Who: All patients with signs or symptoms of fluid retention (e.g. peripheral/pulmonary oedema, PND/orthopnoea or raised JVP)

Why: Improves symptoms

General advice: Use the lowest dose of furosemide necessary to relieve peripheral oedema and signs of pulmonary oedema. Start with furosemide 40 mg per day orally.

Troubleshooting:

- Daily timing need not be fixed. Timing can be changed for social convenience. Dosing after 4pm, can lead to nocturia.
- If not effective in three days double dose – 40mgs b.d, 8am and 2pm
- If still not effective, increase up to 120mg and seek rapid specialist advice.
- Excessive diuretic therapy or intercurrent illness with vomiting/diarrhoea can lead to dehydration causing hypotension, renal dysfunction and gout.
- In the elderly, symptoms of hypovolaemia may be non-specific - washed out, confused, impaired mobility, fall, urinary incontinence.

Other advice: Monitor for symptoms/signs of sodium and water depletion

- Postural dizziness/light headedness
- Excessive and sustained fall in blood pressure
- Significant and sustained weight loss below usual dry weight (e.g. >1 kg, sustained over >1 week).

If patient has any such symptoms, measure U&Es immediately and seek advice from Heart Failure Liaison Service who can rapidly access a specialist cardiologist for advice.

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6. Treatment- Lifestyle changes

Exercise- Patients should keep as active as possible.

NYHA class 1 and 2 – encourage regular aerobic exercise e.g. walking, gardening, bowling, golfing. Aim to accumulate 30 minutes or more of moderate intensity physical activity over the course of most days of the week.

Use Live Active referral if needs more support and encouragement to get started.

NYHA class 3 or 4 – do not avoid gentle exercise. Start with small amounts; the best and safest exercise is simply walking; swimming is not advisable. Live Active referral NOT appropriate.

Alcohol- Alcohol is contraindicated in those with alcoholic Cardiomyopathy. Otherwise can be taken in small quantities, 1 or 2 units/day

Smoking- All patients with heart failure should be strongly advised not to smoke and should be offered smoking cessation advice and support. NRT doubles the quit rate of smokers who want to stop. Consider referral to our local smoke free pharmacy or to smoking cessation. **Contact Quit Your Way 0800 848484 or Quit Your Way Pharmacy 0141 201 4945 for further advice.**

<https://www.nhsinform.scot/healthy-living/stopping-smoking>

Nutrition

Fruit juices: Avoid cranberry juice if taking warfarin (increased potency). Avoid grapefruit juice if taking simvastatin (interference with metabolism)

Food supplements: Avoid St John's Wort (interactions with warfarin, digoxin, eplerenone)

High salt consumption increases water retention. Patients with heart failure avoid salt intake >6g/day.

Salt avoidance- avoid salt rich foods e.g. cheese, bacon and ham, tinned meat, sausages and made up meat dishes (beef burgers, pies) crisps, salted peanuts and other salty snacks, smoked fish, most "fast" foods, tinned and packet soup and stock cubes.

- Use low salt foods instead e.g. fresh fish, fruit, poultry and meat, fresh vegetables cooked without salt.
- Don't add salt at table. **Avoid salt replacements e.g. Lo Salt (high potassium content) soy, sauce, marmite**
- Try to use herbs, spices, mustard, or lemon to add flavour instead.

Consider dietician referral, especially ethnic groups with specific dietary considerations.

Obesity- Encourage small step changes towards modest weight loss targets- try smaller portion on plates reduce fat and sugary foods. Think of cakes biscuits etc as occasional treat. Consider referral to GGC Weight Management service

Cachexia- Encourage small and often eating, give advice regarding calorie dense foods.

Leaflet available from Health Promotion- 0141 201 4915. Consider referral to dietitian.

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7. Recommendations for Usual Annual Care

NYHA:

NYHA I	No symptoms and no limitation in ordinary physical activity.
NYHA II	Mild symptoms and slight limitation during ordinary activity. Comfortable at rest.
NYHA III	Marked limitation in activity due to symptoms, even during less-than-ordinary activity. Comfortable only at rest
NYHA IV	Severe limitations. Experiences symptoms even while at rest.

Ensure patient is on maximum tolerated drug therapy (Sections 2 – 5 above). If already achieved and symptoms persist or patients have increased NYHA class then contact HF nurses for advice about onward referral to cardiologist and/or palliation. Some patients may be persistently symptomatic but stable and may not require further HF team involvement, seek advice if unsure. If NYHA IV ensure HF nurses are involved and patient is on Gold Standards Framework/Palliative Care register.

Fluid status: See section 5 above

Pulse rate: Check pulse annual to determine optimisation of beta-blocker. Sinus rhythm patients should ideally be optimised to approximately 60bpm. Patients with AF are appropriate for more lenient control (e.g. 80bpm).

Pulse rhythm: If new irregularity detected please consider atrial fibrillation. Refer to AF guidelines for advice)

<http://live.nhsggc.org.uk/media/245601/2017-ggc-heart-mcn-management-of-atrial-fibrillation-guidelines.pdf>

Medication compliance: If patient has problems with compliance or needs specialist HF pharmacist advice please refer to Pharmacy Heart Failure Service 0141-201-9398

Lifestyle: See Section 6 above

U&E: Patients should have at least one U&E check annually even if no drug or dose changes. Patients on Spironolactone or Eplerenone should be followed up as per the terms of the Near-Patient-Testing LES.

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8. Further Management– Other heart failure treatment options (under specialist guidance only)

a. Treatment- Mineralocorticoid receptor antagonist (Spironolactone/ Eplerenone)

Who: Add on therapy to patients already on ACE-I (or ARB) and beta blocker in NYHA II – IV heart failure (under specialist guidance only).

Why: Improves symptoms and prognosis in patients NYHA II – IV and either LVEF≤35% or LVEF≤40% + new heart attack

Drug choice: Agent of choice is spironolactone 25 once daily (50mg once daily in exceptional situations) or eplerenone 25-50mg if hormonal side-effects with spironolactone.

Contraindications: Serum potassium >5mmol/l and/or creatinine is, or ever been, > 220µmol/l.

Monitoring: Monitoring of urea and electrolytes: 1 week, 3 weeks and 7weeks after initiation, every 4 weeks for 3 months, then every 3 months for 1 year and every 6 months, thereafter. Monitoring will be undertaken by the HFLNS until the patient is stable.

Sick Day Rules / Patient Information: Temporary stop treatment if there is vomiting/diarrhoea. If symptoms persist > 48hrs seek expert advice (includes HFLNS) because of increased risk of renal dysfunction/hyperkalaemia. Ensure patient has spironolactone or eplerenone monitoring card with information about the drug.

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b. Treatment- Sacubitril/Valsartan

Who: Alternative to ACEI (or ARB) in patients NYHA II – IV, LVEF≤40%, ongoing symptoms despite optimal treatment (e.g. beta blocker, ACEI or ARB, and either spironolactone or eplerenone) AND plasma B-type natriuretic peptide (BNP) level of at least 150 nanograms/L or N-terminal pro-BNP level (NT-proBNP) of at least 600 nanograms/L (or, if they have been hospitalised for heart failure within the previous 12 months, a BNP of at least 100 nanograms/L or NT-proBNP of at least 400 nanograms/L).

Why: Improve quality of life and prognosis in such patients compared to ACEI (or ARB)

Initiation Phase: Patients must have direct input by specialist NHSGGC heart failure teams. GPs should not be asked to initiate by NHSGGC specialist staff, other health boards, tertiary centres and/or private healthcare without local NHSGGC heart failure team involvement. Please contact local NHSGGC specialist heart failure teams if unsure. All patients require an elevated BNP (or NT-proBNP) to qualify for initiation.

Wash Out Period: If the patient is already prescribed an ACEI, the ACEI **MUST** be stopped 48 hours prior to initiation of sacubitril/valsartan to minimise the risk of angioedema. The importance of this wash-out period must **ALWAYS** be communicated directly to the patient, to the GP (in writing) and, if the person receives a weekly adherence aid, the community pharmacy (verbally, at the point the prescription is issued).

Monitoring: All patients started on sacubitril/valsartan should have blood pressure and renal function rechecked 1-2 weeks after initiation and 1-2 weeks after any up-titration. These checks are the responsibility of the specialist heart failure teams and not of primary care (i.e. the GP). The specialist heart failure teams will deliver follow-up monitoring (i.e. renal function, blood pressure and tolerance) in all patients for a minimum of six months post-initiation.

Detailed advice: For in-depth detailed NHSGGC guidance on [Sacubitril/Valsartan](#) **click here** ([link](#))

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c. Treatment- Ivabradine

Who: Add on therapy in NYHA II-IV, in patients in sinus rhythm and whose heart rate is ≥ 75 bpm, in combination with standard therapy including beta-blocker therapy or when beta-blocker therapy is contra-indicated or not tolerated (under specialist guidance only).

Why: Decreases heart failure hospitalisations

General advice: Recommended starting dose is ivabradine 5 mg twice daily (2.5mg twice daily if ≥ 75 years old) and target dose is 7.5mg twice daily. **NB- Ivabradine should not be initiated unless a beta-blocker has been considered and/or fully optimised**

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d. Treatment- Device therapy

Who: Potential additional therapy in appropriate patients with moderate to severe LV dysfunction (LVEF \leq 35%). Such patients should be considered for device therapy on an individual basis. The following table provides a framework to inform the decision-making process.

QRS interval (ms)	NYHA class			
	I	II	III	IV
<120	ICD if there is a high risk of sudden cardiac death			ICD and CRT not clinically indicated
120-149 without LBBB	ICD	ICD	ICD	CRT-P
120-149 with LBBB	ICD	CRT-D	CRT-P or CRT-D	CRT-P
≥ 150 with or without LBBB	CRT-D	CRT-D	CRT-P or CRT-D	CRT-P

ICD = implantable cardioverter defibrillator; CRT-D = cardiac resynchronisation therapy with an implantable cardioverter defibrillator; CRT-P = cardiac resynchronisation therapy with pacing

LBBB= Left bundle branch block

Why: CRT can improve both symptoms and prognosis in appropriate patients and ICD can improve prognosis (no benefit on symptoms)

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e. Treatment- Digoxin

Who: Patients with symptomatic heart failure, sinus rhythm and LVEF $<$ 40%.

Why: Decreases heart failure hospitalisations (but evidence is weak and pre-dates most other modern treatments)

General Advice: Doses between 62.5microgram and 250microgram daily can be used depending on body weight and renal function. Side effects include anorexia, nausea, vomiting, bradycardia, ventricular arrhythmias, vision disturbances (e.g. xanthopsia). In the elderly, symptoms may be non-specific – See section on fluid retention above. If these occur, check blood digoxin level.

Monitoring: Check U&Es before initiating therapy or if signs of toxicity (to exclude hypokalaemia and uraemia)

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f. Treatment- Hydralazine-isosorbide dinitrate (ISDN)

Who: For patients intolerant of ACEI or ARB due to renal dysfunction and/or hyperkalaemia.

Why: Improved prognosis (but evidence is weak, from small numbers and pre-dates most other modern treatments)

General Advice: Initial dose hydralazine 25mg/isosorbide dinitrate 10mg three times daily, increasing gradually (depending on tolerance) to a maximum hydralazine 75mg/ISDN 40mg tds

Starting Dose	25mg tds Hydralazine	ISDN 10mg tds
Next Titration Step	50mg tds Hydralazine	ISDN 20mg tds
Target Dose	75mg tds Hydralazine	ISDN 40mg tds

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9. Treatment- Palliative / Supportive Care Approach

Patients with heart failure who remain symptomatic or continue to have hospital admissions despite evidence based therapies should be considered for a collaborative cardiology and palliative approach to care. Cardiology therapies should continue where clinically appropriate but in addition quality of life issues should be addressed such as the management of symptoms both cardiac and non-cardiac. Signposting to financial, social and psychological support should also be provided where required after assessment. Early identification of patients with ongoing symptoms and unmet needs allows for interventions to improve quality of life but in addition time to identify patients' preferences and priorities of care necessary to develop tailored medical anticipatory care plans. Most patients require a generalist palliative approach integrated with their cardiac care but access to specialist palliative care should be made available when needed.

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10. Heart failure nurse service contact details

To arrange HFNLS follow up for patients who have had a recent admission to hospital with heart failure secondary to LVSD and who have not been picked up by the service, contact your HFLNS to arrange follow-up. This can be done by phone or in writing but not via cardiology SCI referral.

Once heart failure symptoms are stable, treatment optimised and appropriate self management and social needs are met then patients will no longer receive planned HFLNS support. Any patient who develops worsening symptoms however, may re-access the service either through their GP as indicated above, or may contact the service themselves on the following numbers:

- Queen Elizabeth University Hospital - 0141 451 6132
- Glasgow Royal Infirmary - 0141 211 4543
- West of Glasgow ACH- 0141 201 0383
- Royal Alexandra Hospital - 0141 314 9701
- Victoria ACH -0141 347 8076
- Inverclyde Royal Hospital- 01475 505130
- Stobhill ACH - 0141 355 1840

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