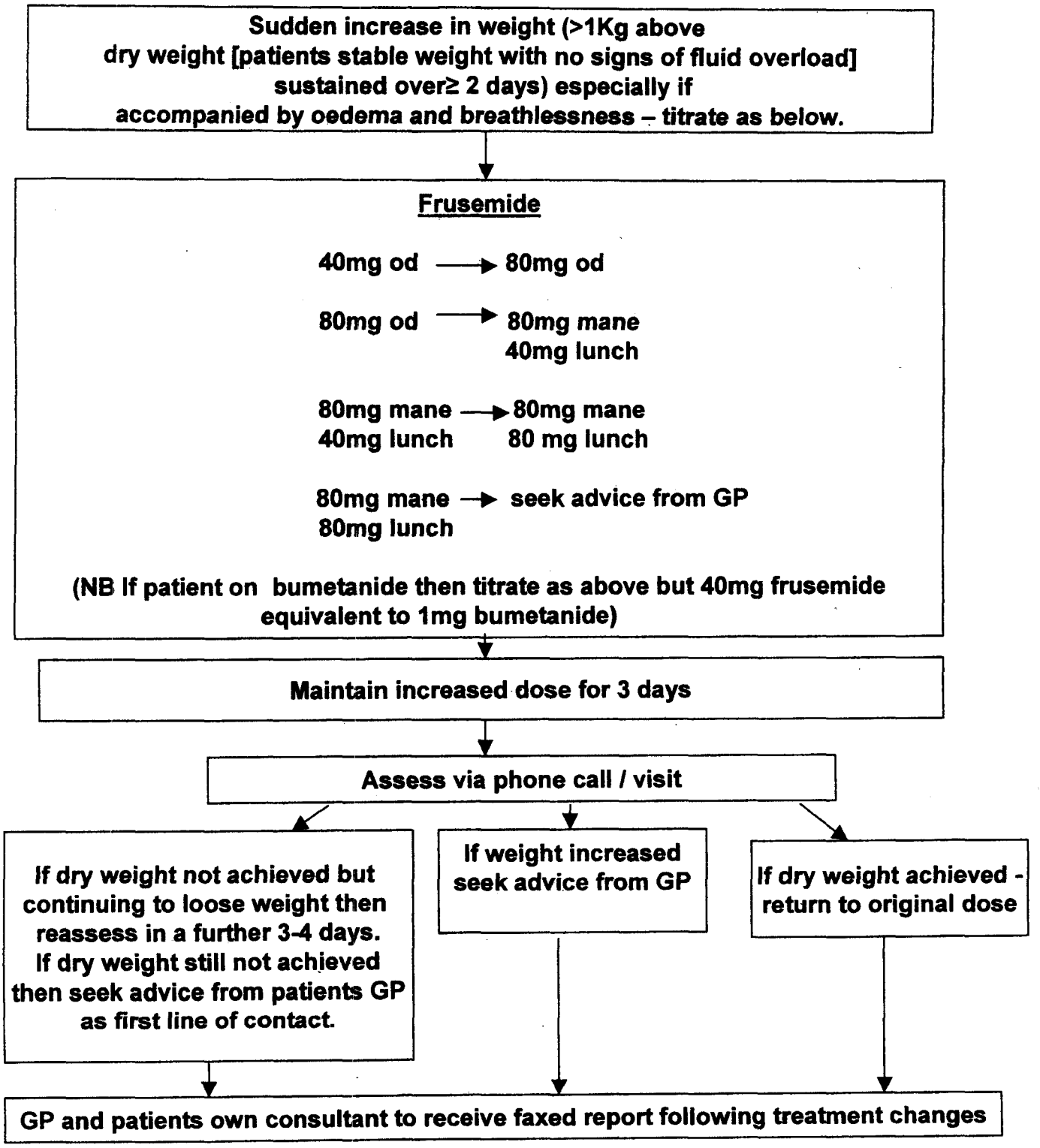
Contents

Increasing Loop Diuretic



NB HFNS will only make <u>one</u> incremental change before seeking advice from

GP → Specialist GP → Consultant

Decreasing Loop Diuretic

Signs of fluid depletion
ie .≥ 1Kg weight loss from dry weight sustained over ≥ 2 days, increased urea ≥ 5mmols or ≥ 25% from baseline, postural hypotension / dizziness, thirst

If:
•Peripheral oedema
•Raised JVP
Seek advice from GP

If:
•No peripheral oedema
•JVP not raised
Titrate as below

Frusemide

>240mg / day	→	seek advice
120mg mane 120mg lunch	→	120mg mane 80mg lunch
120mg mane 80 mg lunch	→	80mg mane 80mg lunch
80mg mane 80mg lunch	→	80mg mane 40mg lunch
80mg mane 40mg lunch	→	80mg od
80mg od	→	40mg od
40mg OD	→	seek advice

Assess within 48 hours via phone or visit

Unacceptable response i.e. still below dry weight or now above dry weight - seek advice from GP in first instance

Acceptable response i.e. back to dry weight

Reassess 48 hours

Unacceptable response ie. weight above or below dry weight

Seek advice from GP

Acceptable response -discuss possible permanent change in therapy with GP

Thiazide diuretics and metolazone

Prescription and initiation will be via GP or hospital consultant (facilitated by HFNS if necessary). Combination of thiazide / metolazone and loop diuretic must be used with extreme caution and only after careful medical consultation.

These diuretics may be used in addition to loop diuretics in patients with severe heart failure. Unlike loop diuretics, thiazides and metolazone are long acting and adjustment of the timing of dosing is not as advantageous as for loop diuretics.

Cautions – aggravates diabetes and gout; may exacerbate systemic lupus erythematosus; elderly; hepatic and renal impairment; porphyria; profound diuresis on concomitant administration with frusemide (metolazone); pregnancy and breast feeding

Contra-indications – refractory hypokalaemia; hyponatraemia; hypercalcaemia; severe renal and hepatic impairment; symptomatic hyperuricaemia; Addison's disease

When thiazide / metolazone is combined with loop diuretics patients urea and electrolytes (U+E's) will be checked weekly for the first 4 weeks and monthly thereafter if stable and no change in therapy or condition.

Advice will be sought if U+Es are outside normal range (see Blood Chemistry monitoring – diuretics section).

If patient is showing signs of fluid depletion on combined therapy then thiazide / metolazone would be reduced / discontinued initially (following discussion with GP) followed by reduction in loop diuretic as per protocol if required.

Spironolactone

Spironolactone will be prescribed by GP / hospital medical team – this may be facilitated by HFNS if patient thought to be suitable

Indication - Patients who remain symptomatic (NHYA classification III or IV) despite treatment with an ACE inhibitor and diuretic(s) and where indicated a beta blocker (based on RALES trial)
Cautions – elderly; hepatic impairment; renal impairment; porphyria; blood chemistry as indicated below
Contra-indications – hyperkalaemia, hyponatraemia, pregnancy and breast feeding, Addison's Disease

•K+ supplements and K+ sparing diuretics should be discontinued 2 weeks prior to spironolactone being commenced.
•Loop diuretics should be used as an alternative during this time
•Cautions and contra-indications will be assessed

HFNS will ensure baseline U+Es are checked prior to initiation

If:
•Creat >200 µmol
•Urea >11.2 mmol
•K >4.5 mmol

Seek advice

If:
•Creat <200 µmol
•Urea<11.2 mmol
•K<4.5 mmol

Commence therapy at 25mg od (lower if concern)
Target dose 25-50mg od

HFNS will ensure U+Es are checked 1 week after initiation

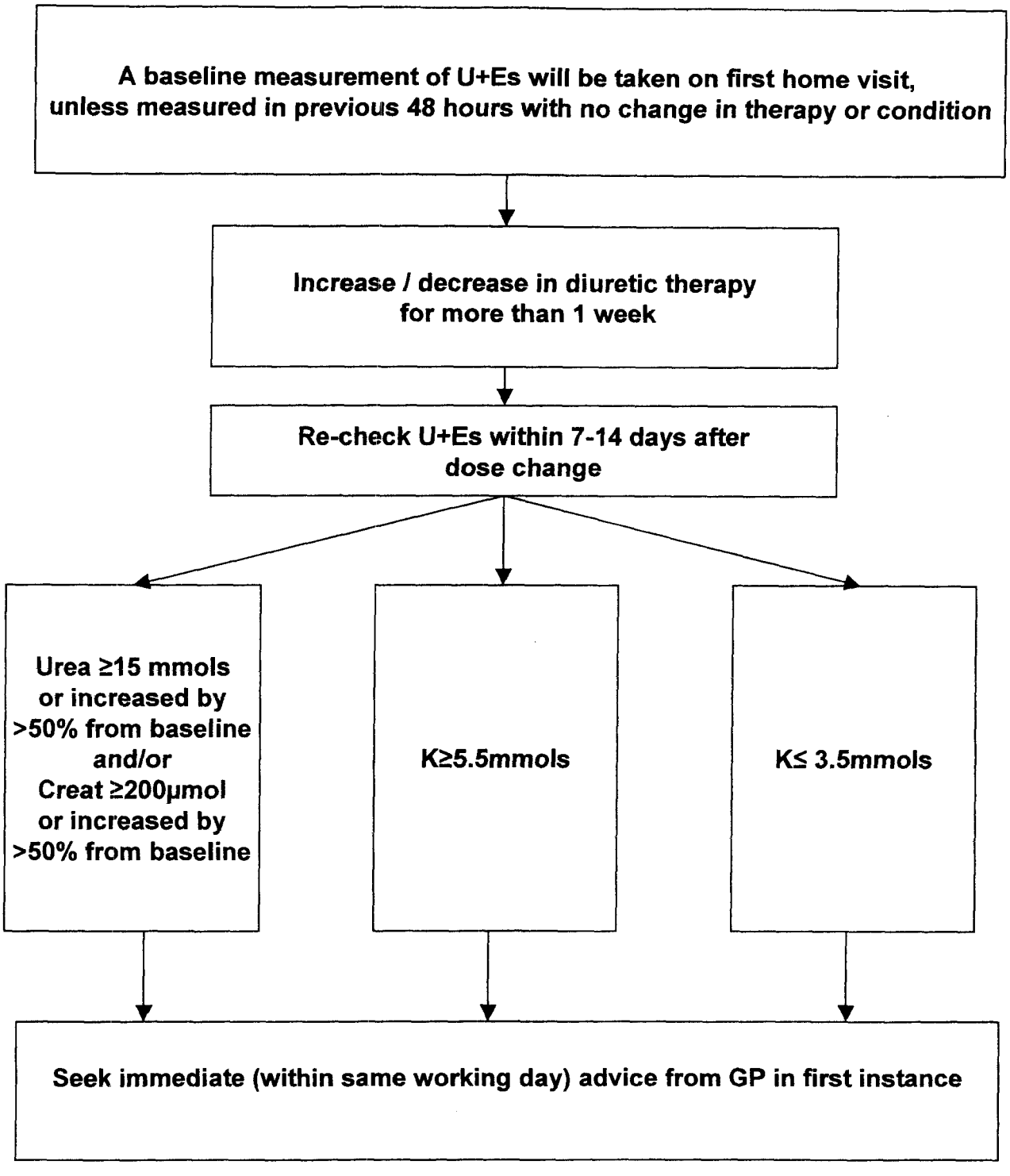
If:
•Creat≥250µmol / increase by 25% from baseline
•Urea ≥18mmol / increase by 50% from baseline
•K ≥5.5mmol
•Diarrhoea / vomiting or any other cause of sodium and water loss

Stop therapy and contact GP
Spironolactone or loop diuretics may need decreasing

If:
•Creat <250umol / no increase by 25% from baseline
•Urea <18mmol / no increase by 50% from baseline
•K <5.5mmol
•No diarrhoea/vomiting

Continue treatment and monitor U+Es 4,8+12 weeks; 6,9+12 months; 6 monthly thereafter, stopping / reducing treatment as per protocol if necessary

Blood Chemistry Monitoring - diuretics



Blood chemistry monitoring - general

Test	Responsibility	Time scale
Full blood count	Heart failure nurse while under their care. Long term -CHD lead nurse /support team or district nurse	Annually unless clinically indicated
Urea and creatinine + Electrolytes	Heart failure nurse while under their care. Long term -CHD lead nurse /support team or district nurse	As per protocols initially then 6 monthly
Glucose	Heart failure nurse first sample. Long term -CHD lead nurse /support team or district nurse	Annually –random sample preferred
Serum cholesterol	Heart failure nurse while under their care. Long term -CHD lead nurse / support team or district nurse	Annually once cholesterol satisfactory on stable satin dose
Liver enzymes, bilirubin	Heart failure nurse while under their care. Long term -CHD lead nurse /support team or district nurse.	Annually unless clinically indicated
Albumin	Heart failure nurse while under their care. Long term CHD lead nurse /support team or district nurse	Once for all patients then only if clinically indicated
Thyroid function	Heart failure nurse while under their care. Long term CHD lead nurse /support team or district nurse	Not routine – only if clinically indicated
Digoxin levels	Heart failure nurse while under their care. Long term CHD lead nurse /support team or district nurse	As clinically indicated

ACE Inhibitors

Initial prescription will be via GP or hospital consultant (facilitated by HFNS if necessary)
Cautions / seek specialist advice – best avoided in known or suspected renovascular disease, renal dysfunction, severe hypotension (systolic BP<90mmHg or syptomatic hypotension)
Contraindications – hypersensitivity to ACE-I including history of angioedema, significant renovascular disease, aortic stenosis, outflow tract obstruction, pregnancy

	Starting dose	Incremental rise	Target dose
Preferred options			
Ramipril	2.5mg od	2.5mg	10mg od (or 5mg bd)
Lisinopril	2.5-5mg od	2.5mg	30mg od
Patients may also be seen on (although not preferred):			
Captopril	6.25mg tds	2nd dose 12.5mg tds then in 12.5mg increments	50-100mg tds
Enalapril	2.5mg bd	2.5mg	10-20mg bd
Perindopril	2mg	-	4mg

BP and U+Es will be checked at 7-14 days following each increase.
There will therefore be a minimum of 1 week between each increase

If:
- **Symptomatic hypotension**
- **Asymptomatic hypotension (systolic BP <90mmg)**
- **Creat≥200 µmol or >50% from baseline**
- **urea ≥15 mmols or >50% from baseline**
- **K >5mmol**

Seek advice from GP in first instance and GP specialist / hospital consultant as necessary.

If:
- **No symptomatic hypotension**
- **No asymptomatic hypotension**
- **No renal impairment**

Continue up titration and BP / blood chemistry monitoring as above until target dose achieved

Check U+E's 2 weeks after target dose (or maximum dose tolerated) is achieved

If U+E's remain acceptable and other treatment remains stable then 6 monthly review (GP)
If U+E's outside acceptable limits – seek advice

Angiotensin II Receptor Antagonists

Prescription and initiation will be via GP or hospital consultant and facilitated by HFNS as necessary

To be used only if patient is truly intolerant of an ACE inhibitor due to persistent cough.

Cautions – renal artery stenosis, aortic / mitral valve stenosis, obstructive hypertrophic cardiomyopathy
Contraindications - pregnancy

Prior to initiation and on increasing dose, U+Es and blood pressure will be checked and limits applied as per ACE Inhibitor protocol.

Preferred choice of drug is Valsartan (only A II antagonist at present with significant data in heart failure):
Starting dose - 80mg od (40mg in those over 75 years or with other cautions).
Increased to - 160 od (80mg for those with hepatic impairment) after 4 weeks if blood chemistry / BP within limits as specified for ACE Inhibitors.

Alternatives that may be seen are Candesartan, Irbesartan and Losartan.

Beta Blockers

To be prescribed and commenced under specialist supervision only*

Patients whose heart failure is stable (no admission into hospital in the last month, no alteration in therapy in last 2 weeks) and who are taking maximum standard therapy (ACE and possibly digoxin) will be referred to specialist* for initiation.

Cautions / seek specialist advice – severe (NYHA class IV) HF, heart rate <50bpm
Contra-indications – history of bronchospasm; severe asthma; uncontrolled heart failure; sick sinus syndrome, 2nd or 3rd degree heart block (without pacemaker); severe peripheral arterial disease

Patients who do not meet these criteria but may benefit from therapy will be referred to the cardiologist for review

	Starting dose		Incremental rises			Maintenance dose
Week	1	2	3	5	8	12
Bisoprolol (od)	1.25mg	2.5mg	3.75mg	5.0mg	7.5mg	10mg
Week	1		4	6		8
Carvedilol (bd)	3.125mg		6.25mg	12.5mg		25mg (patients >85Kg - 50mg)

NB Intervals given are a minimum level and progression may be slower if necessary

Patients will be assessed within 4 days (phone or visit)

If:
- **Decrease in heart rate <50bpm**
- **Symptomatic hypotension**
- **Asymptomatic hypotension (BP<90systolic)**
- **Evidence of respiratory problem but no weight gain**

Seek advice from initiating physician

If:
- **No decrease in heart rate**
- **No symptomatic hypotension**
- **No asymptomatic hypotension**

Continue up titration

If significant weight gain and shortness of breath see diuretic protocol

NB Beta blockers will not be stopped without prior consent

Improvement - continue up titration

No improvement - seek advice from specialist*

* Specialist supervision = Specialist GP / Cardiologist / General Physician / Care of the Elderly Physician

Digoxin

Therapy will be prescribed and initiated by patients GP independently or under hospital consultant advice (facilitated by HFNS if necessary).

Consider patients:
•in sinus rhythm with symptomatically severe heart failure
(NYHA class III or IV) despite optimal therapy (diuretics and ACEI)
•with recurrent hospital admissions for heart failure
•in atrial fibrillation who are not suitable for beta-blockers

Cautions – sick sinus syndrome; thyroid disease; recent infarction; reduce dose in elderly and renal impairment; pregnancy; hypertrophic obstructive cardiomyopathy (with concomitant AF+heart failure only, otherwise contra-indicated)

Contraindications – complete heart block; 2nd degree AV block; supraventricular arrhythmias caused by Wolff-Parkinson-White syndrome

Check plasma digoxin levels if:
•digoxin toxicity is suspected (nausea + vomiting, headache, confusion, visual symptoms, arrhythmias - AV block, VT, AV junctional rhythms, atrial tachycardia)
(NB patient with signs of toxicity can show levels within normal limits)
•patient is commenced on other drugs which are known to alter levels e.g. erythromycin, amiodarone
•patient has poor or worsening renal function

Blood potassium concentrations should also be monitored regularly and hypokalaemia avoided (predisposes to digitalis toxicity).

Non- heart failure medications

Patients with heart failure are usually elderly and have concomitant cardiovascular and non-cardiovascular problems for which they receive treatment. A number of commonly used drugs may lead to clinical deterioration of heart failure.

The HFNS will assess for medications that may exacerbate heart failure or interact with usual medication. In particular:

- 'over the counter' drugs especially NSAIDs, high dose aspirin, St John's Wort, liquorice and some herbal and homeopathic remedies

- most calcium channel antagonists (except amlodipine and felodipine which should be used only for angina or uncontrolled hypertension).

- corticosteriods – by causing sodium and water retention

- tricyclic antidepressant drugs – may depress cardiac function and have pro-arrhythmic effect.

- care with patients on lithium as levels can be affected by changes in diuretic doses. For patients on lithium the levels should be checked each time U+Es are done.

- Erythromycin and some antifungal agents – prolongation of QT interval; may precipitate ventricular arrythmias

- Terfenadine and other anti histamines – blockade of potassium channel and prolongation of QT interval; may precipitate ventricular arrhythmias especially if given with erythromycin and antifungal agents eg ketoconazole and mibefradil

- ensure side effects / interactions of any new drugs are checked in BNF prior to commencement

Advice for patients - medications

The HFNS will be giving advice to patients and their carers about several aspects of heart failure including medication and lifestyle as detailed below. The BHF booklet 'Medicines for the Heart' will be used to supplement any information given.

Diuretic therapy

- Timing need not be fixed for loop diuretics (eg could postpone morning dose until after shopping trip), however it is better to avoid taking after 4-6pm as this can lead to nocturia.
- There is little advantage in moving the time of dosing for thiazides and metazolone as they are long acting.
- Report dizziness / light-headedness as this may indicate overtreatment.
- Advise caution in hot weather (risk of dehydration) and ensure adequate fluid intake.
- Report diarrhoea and/or vomiting (more than 2 episodes in 24 hours) to HFNS / GP / practice nurse
- Report sudden, sustained weight loss / gain (more than 1kg over 3 days) to HFNS / GP / practice nurse.
- Report other symptoms of fluid overload ie increasing breathlessness, frothy sputum, peripheral oedema, to HFNS / GP / practice nurse as soon as possible.

Ace-inhibitor therapy

- Report any blackouts (urgently) / dizziness / light-headedness to HFNS / GP / practice nurse.
- Report signs of angioedema urgently to HFNS / GP / practice nurse (ring 999 if signs of respiratory distress).
- Stress importance of having biochemistry and blood pressure checked during titration and at least annually thereafter.
- Advise to take first dose at night.
- Advise of other possible side effects ie persistant dry cough, rash, GI symptoms, upper respiratory symptoms (sinusitis, rhinitis, sore throat)

Angiotension II receptor antagonists

- Same advice as above with the exception of warning about cough

Beta blockers

- Advise that beta-blocker should help heart failure in long term therefore no immediate symptomatic improvement expected.
- Advise patient they may experience initial, temporary worsening of heart failure symptoms eg weight gain, ↑breathlessness, ↑oedema and to report to HFNS / GP / practice nurse so that other medication (particularly diuretic) may be altered .
- Advise to report any other side effects in particular problems with dizziness / light-headedness / syncope or bronchospasm and fatigue, which could indicate hypotension or bradycardia.
- Advise on other common, potential side-effects ie cold peripheries, impotence, sleep disturbances

Spironolactone

- Advise to report any illness or circumstances that may cause fluid depletion eg. diarrhoea and / or vomiting, excessive perspiring, reduced / no fluid intake to HFNS / GP / practice nurse.
- Advise to report any postural dizziness / light-headedness / syncope, significant and sustained weight loss (≥1kg over 3 days), confusion, cramps, muscle weakness (may indicate fluid depletion / electrolyte imbalance) to HFNS / GP / practice nurse
- Advise of other common, potential side effects ie impotence, GI disturbance, gynaecomastia, menstrual irregularities
- Reiterate importance of having blood chemistry regularly checked.

Digoxin

- Advise of any side effects that may indicate digoxin toxicity ie nausea and vomiting, anorexia, yellow tint to vision (xanthopsia), confusion, falls (esp. in elderly) and to report to HFNS / GP / practice nurse.
- Importance of having levels checked if certain other medications are commenced in particular amiodarone, erythromycin

'Over the counter' drugs

- Advise to inform HFNS / GP / practice nurse / pharmacist prior to taking any 'over the counter' drugs as they may worsen heart failure especially NSAIDs, larger doses of aspirin, St John's Wort (may interact with digoxin and warfarin), some herbal and homeopathic remedies

Immunisation

All patients should be advised to have a once-only pneumococcal immunisation and annual influenza immunisation.

Advice for patients – lifestyle

Diet

- Patients will be advised to reduce their salt intake from added salt and processed food.
- A cardioprotective diet will also be advised with emphasis placed on eating 5 portions of fruit or vegetables a day and oily fish 2-3 times per week. NB. specialist dietetic advice will be sought as necessary for those patients who are underweight (BMI <20), cachexic or obese (BMI >30), or with special dietary needs eg renal diet.
- Some patients may benefit from a fluid restriction (1-1.5L on discussion with medical staff) and this will be explained and encouraged where appropriate.

Alcohol

- Patients will be advised that an excessive intake of alcohol can exacerbate their symptoms so they should stay within recommended limits (14 units/week for women, 21 units / week for men, with at least 2 alcohol free days/ week).
- Patients will also be advised to avoid binge drinking.
- Patients with alcohol related dilated cardiopymopathy will be advised to abstain from alcohol.

Exercise

- Most patients with heart failure can benefit from some form of exercise.
- Exercise will be discussed and appropriate patients will be advised to take-up or continue with aerobic exercise within their capabilities eg walking, swimming
- The ultimate aim is to take 30 minutes aerobic exercise 5x per week, however any increase in activity will beneficial.
- The importance of safety will be stressed with patients advised to exercise to the point of being 'comfortably out of breath' (ie. breathless but still able to speak in sentences).
- For those with angina advice about management of chest pain and use of GTN spray will be given
- Referral to heart failure exercise programme will be made as appropriate once classes in progress

Smoking

- Basic smoking cessation advice and information will be available for patients who smoke.
- They will be assessed regarding their stage of change and readiness to try and stop.
- Referral to specialist smoking cessation service will be made as appropriate for those patients wishing to make a quit attempt.