**This is a guide to monitoring; increase monitoring may be required given patient’s status and co-morbidities (ie. renal insufficiency)**
Angiotensin Converting Enzyme Inhibitors (ACEI) / Angiotensin Receptor Blockers (ARBS)*

Heart Failure Medication Initiation and Titration

**This algorithm is intended for single agent (ACEI or ARB)

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**Initiation**
- Symptomatic HF or LVEF < 40%
- Bilateral renal artery stenosis
- Moderate/Severe aortic stenosis
- Hyperkalemia: K+ > 5.5 mmol/L
- Renal Dysfunction: Serum Creatinine > 220 µmol/L
- Hypotension: SBP < 90 mmHg or symptoms
- Allergy: angioedema, hives, rash
- Intolerance: cough (ACE)

**Titration**
- Titrating every 1-3 weeks, depending on tolerance
- Goal: Target dose (see dosing) or maximum tolerated dose
- Hypotension: SBP < 90 mmHg with symptoms*

**Assess**
- BP
- K+
- Scr

**Initiation of ACEI/ARB**
- Baseline Scr / GFR
- Baseline K+
- Baseline blood pressure

**Blood Pressure**
- Every Visit

**Serum Creatinine**
- 1 week after: 1) initiation 2) dosage increase* 3) > 30% ↑ in Scr

**Serum Potassium**
- 1 week after: 1) initiation 2) dosage increase*

**Considerations:**
- Baseline cough
- K+ supplements
- K+ sparing diuretics
- MRA
- NSAIDS/COX2 inhibitors

**Volume depletion**
- Reduce/hold diuretic x 2-3 days

**Volume overload**
- Reassess diuretic dose / other non-essential meds that lower BP
- Consider staggering doses
- Reduce/hold dose of other vasodilators +/- ACEI/ARB x 1-2 weeks

**Hyperkalemia**
- K+ > 5.2 mmol/L*
- *Watch for trends

**Fluid Assessment**
- Euvolemic

**Renal dysfunction**
- >30% in serum creatinine*
- *Watch for trends

**Scr in 5-7 days**
- Rechallenge at lower dose

**Other considerations:**
- Angioedema:
  - Stop ACEI/ARB contact physician
  - Do not rechallenge
  - Caution when substituting ARB for ACEI

**Cough:**
- Assess at baseline as may be due to worsening HF
- If intractable cough secondary to ACEI consider:
  - Trial of another ACEI or lower dose
  - Switch to ARB
- Reassess in 2 weeks and document

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*See dosing section

*See monitoring section

*Obtain baseline value prior to any up-titration or change in symptom status

If stable: Q 3-6 months

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August 2017
**Beta - Blockers**

**Heart Failure Medication Initiation and Titration**

**Initiation**

- LVEF < 40%

**Titration**

- Titrate every 2-4 weeks, depending on tolerance

**Assess**

- BP
- Heart Rate
- Fluid Status

**Considerations**

- Hyperkalemia
- PHD
- Cardiac rhythm disturbances
- Fluid retention

**Conduction Abnormality**

- Bifascicular block PR interval prolongation (>0.24 msec)
- Bradycardia: HR < 60 bpm or symptomatic
- Hypotension: SBP < 90 mmHg or symptomatic

**See monitoring section.**

**Monitoring**

- Initiation of BB
- Blood Pressure
- Heart Rate
- Fluid Assessment
- Other

*verapamil and diltiazem are contraindicated in systolic heart failure (EF < 40%)

**This is a guide to monitoring; increase monitoring may be required given patient’s status and co-morbidities**
Diuretics

Heart Failure Medication Initiation and Titration

**Initiation**

Heart failure with signs and symptoms of fluid overload*

- Fluid Assessment:
  - Worsening / new SOB
  - Worsening SOB/OE
  - Recent weight gain**
  - Peripheral pitting edema
  - Orthopnea/PND
  - Sacral edema / Ascites
  - JVP assessment-JVD
  - Hepatomegaly
  - Pulmonary edema: rales, crackles, CXR

**Titration**

Titrating up, down or maintain according to symptoms

- **Goal**: Minimum dose to achieve euvolemia; dose should be reassessed each visit

- Hypotension SBP<90mmHg with symptoms

- Hypokalemia K+<3.5 mmol/L*

- Renal dysfunction >30 % ↑ in serum creatinine*

**Assess**

- Fluid Status
  - *Watch for trends*

- Blood Pressure
  - *Watch for trends*

- K+

- SCr

**Considerations:**

- K+ supplementation
  - Addition of ACEI/ARB/ARNI
  - MRA
  - Renal function
  - GI loss

**Indication of Diuretic**

- Baseline Scr / GFR
- Baseline K+
- Baseline blood pressure

**Serum Creatinine**

1 week after:
1) initiation
2) dosage increase**
3) >30 % ↑ in Scr

**Serum Potassium**

1 week after:
1) initiation
2) dosage increase**

**Blood Pressure**

Every visit or telephone assessment (home/pharmacy monitoring)

**Monitoring**

**See dosing section**

**See monitoring section**

*Common signs and symptoms include new and worsening shortness of breath, weight gain, HF cough, orthopnea, paroxysmal nocturnal dyspnea, peripheral edema, ascites

**Weight gain: 2-3 lbs in 1-2 days or 5 lbs in 1 week

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Consider IV Lasix if non responsive to oral Lasix and Metolazone

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*Indication of Diuretic*

- Fluid Assessment
  - Every visit or telephone assessment to titrate diuretics

**Serum Creatinine**

1 week after:
1) initiation
2) dosage increase**
3) >30 % ↑ in Scr

**Serum Potassium**

1 week after:
1) initiation
2) dosage increase**

**Blood Pressure**

Every visit or telephone assessment (home/pharmacy monitoring)

**Obtain baseline value prior to any up-titration or Δ in symptom status**

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August 2017
Mineralocorticoid Receptor Antagonists (MRA)

Heart Failure Medication Initiation and Titration

### Initiation

Symptomatic heart failure (NYHA II-IV) on ACEI/ARB/ARNI + BB and LVEF < 40%

- **Hyperkalemia:** K+ > 5.2 mmol/L
- **Renal dysfunction:** Serum creatinine > 220 µmol/L, or a creatinine clearance < 30 ml/min

### Titration

- **K+**
- **Scr**

**Assess**

- **Hyperkalemia:** K+ >5.2 mmol/L
  - *Watch for trends*
- **Renal Dysfunction:** > 30 % ↑ in Scr
  - *Watch for trends*

### Considerations:

- **K+ supplements**
- **-K+ sparing diuretics**
- **-Dietary K+**
- **-ACEI/ ARB/ ARNI**
- **-Renal dysfunction**

**K+ >5.5**

- Stop K+ supplements, dietitian consult. If no major changes in K+ dietary intake, then Reduce/hold MRA
- Serum K+ in 3-5 days

**K+ 5.2-5.5**

- Stop K+ supplements, Hold MRA
- Reduce/hold ACE/ARB/ARNI
- Refer to physician/NP
- Serum K+ in 2-3 days

### Fluid assessment

- **Volume deplete**
- Reduce/hold diuretic x 2-3 days
- Scr in 5-7 days

- **Euvolemic**
- Reduce/hold MRA
- Scr in 5-7 days

- **Volume overload**
- Reduce/hold MRA
- Refer to diuretic algorithm
- Scr in 2-3 days

**Initiation of MRA**

- After initiation: 3 days, 1 week, 4 weeks, then monthly x 3
- Prior to up-titration of MRA
- 1 week post up-titration of MRA
- With dehydration, illness, change in symptom status or change in other medications affecting potassium/serum creatinine

**Serum Creatinine**

**Serum Potassium**

- **Goal is to keep patient at target or maximally tolerated dose of evidence based medications**
- **Clinical course of HF is variable—frequent reassessment of medication regime required**
- **Complete and thorough history and physical assessment essential with each dose adjustment.**

**Key Points**

- **DOSING:** The usual dose is 25 mg daily, however, those with poor renal function and/or a history of hyperkalemia should be initiated on 12.5 mg daily and titrated as tolerated. Some patients may have their dose increased to 50mg with close monitoring.
- **Populations studied:**
  - Spironolactone*: LVEF < 35 % and NYHA III-IV HF
  - Eplerenone: high risk NYHA II [aged >55 years and LVEF ≤35% and QRS duration >130 ms], and recent hospitalization for HF or elevated BNP/NT-proBNP levels
- **Recent evidence has documented significant issues with hyperkalemia and renal dysfunction and warrants close clinical monitoring**
- **Stop K+ supplementation and other K+ sparing diuretics at initiation of MRA**
- **Should be on ACEI/ARB/ARNI + BB prior to initiation**

**Other considerations:** Gynecomastia (4-5% of males) with spironolactone. Consider switching to Eplerenone.

**Monitoring**

- **Baseline Scr / GFR**
- **Baseline K+**

**See key points**

**See monitoring section**

**August 2017**

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