FUROSEMIDE ORAL SLIDING SCALE FOR HEART FAILURE OUTPATIENTS

Furosemide is important in the management of heart failure (HF) symptoms / congestion (e.g. shortness of breath, increase in weight, swelling), but it does not reduce the risk of mortality & can limit titration of HF medications that do (e.g. ACEI / ARB / ARNI, β-blocker, MRA, SGLT2i). As such, **furosemide should be reassessed at every visit & titrated to the minimum effective dose to maintain euvolemia** – which may include reducing it to PRN use. Several factors influence fluid status (see below), & adjusting furosemide can help reduce the risk of volume depletion (e.g. low blood pressure, decline in renal function) & volume overload (e.g. new or worsening HF symptoms, ER visit or hospital admission). Certain patients may be able to self-adjust their furosemide, after receiving initial guidance from the healthcare team with instructions on when to seek further support.

GOAL: EUVOLEMIA

At dry weight with no or mild HF symptoms (i.e. NYHA class I to II). Dry weight = ideal weight without extra fluid accumulation / congestion, which can change over time. Furosemide dose required to achieve euvolemia is individualized & can range from no furosemide required → furosemide PRN only → scheduled low daily dose → scheduled high BID dose ± metolazone. Dose required to maintain euvolemia can change over time.

CONSIDERATIONS FOR ASSESSING & MANAGING HYPOVOLEMIA / VOLUME DEPLETION, WITH GOAL OF ACHIEVING EUVOLEMIA

Is the patient experiencing any signs & symptoms of hypovolemia, without signs / symptoms of worsening heart failure?

- postural hypotension >SBP 20/DBP 10mmHg
- postural ↑ in heart rate >30bpm
- weight stable or below dry weight
- weak, tired
- confused
- cool, clammy skin
- reduced urine output

Does their bloodwork suggest they are "dry" / no congestion?

- decline in renal function
  - was an ACEI, ARB, ARNI, MRA or SGLT2i recently started or titrated?
- SCr / BUN ratio <12 (or <10)
- ↑ K^+ (stop K^+ supplement, if applicable)
- NTproBNP / BNP stable or reduced

Is the patient taking more diuretic than prescribed?

- explore & address reasons for over-use
- re-visit plan for when to contact healthcare provider(s)

Is the patient drinking less than 1.5 L / day?

- consider all fluids, including soup
- recommend ↑ to 1.5 - 2 L of fluid / day

Does the patient have an acute illness with fluid loss?

- e.g. fever, diarrhea, vomiting
- hold SADMANS medications while ill (e.g. ACEI, ARB, diuretics, SGLT2i); restart when patient is feeling well again

Reduce or Hold Diuretic(s)

- **if the patient is on metolazone**, reduce or hold for 2 to 3 days prior to adjusting furosemide
- if not on metolazone, **reduce furosemide in 20mg to 40mg increments, or hold** for 2 to 3 days
  - if the patient is on furosemide BID dosing, use clinical judgement to determine if decreasing one or both doses
- **if an ARNI or SGLT2i was recently started**, reduce furosemide by 30-50%
- if the patient is on **spironolactone**, remember it is a weak natriuretic agent; it usually only needs to be held if hyperkalemia

Reassess in 2 to 3 days

- reassess signs & symptoms of both hypovolemia & HF, along with bloodwork (e.g. renal function, electrolytes, NTproBNP / BNP); adjust according to clinical scenario, for example:
  - **if still hypovolemic & no HF symptoms**, further reduce furosemide by 20mg to 40mg increments
  - **euvolemic & no HF symptoms,** continue to hold diuretic & monitor; educate patient to report if / when HF symptoms return
  - **if mild HF symptoms**, consider restarting diuretic at same or lower dose, or monitor & restart if symptoms worsen

L.Kosar www.RxFiles.ca © Nov 2020

FUROSEMIDE ORAL SLIDING SCALE FOR HEART FAILURE OUTPATIENTS

Furosemide is important in the management of heart failure (HF) symptoms / congestion (e.g. shortness of breath, increase in weight, swelling), but it does not reduce the risk of mortality & can limit titration of HF medications that do (e.g. ACEI / ARB / ARNI, β-blocker, MRA, SGLT2i). As such, **furosemide should be reassessed at every visit & titrated to the minimum effective dose to maintain euvolemia** – which may include reducing it to PRN use. Several factors influence fluid status (see below), & adjusting furosemide can help reduce the risk of volume depletion (e.g. low blood pressure, decline in renal function) & volume overload (e.g. new or worsening HF symptoms, ER visit or hospital admission). Certain patients may be able to self-adjust their furosemide, after receiving initial guidance from the healthcare team with instructions on when to seek further support.

GOAL: EUVOLEMIA

At dry weight with no or mild HF symptoms (i.e. NYHA class I to II). Dry weight = ideal weight without extra fluid accumulation / congestion, which can change over time. Furosemide dose required to achieve euvolemia is individualized & can range from no furosemide required → furosemide PRN only → scheduled low daily dose → scheduled high BID dose ± metolazone. Dose required to maintain euvolemia can change over time.

CONSIDERATIONS FOR ASSESSING & MANAGING HYPERVOLEMIA / VOLUME OVERLOAD, WITH GOAL OF ACHIEVING EUVOLEMIA

Is the patient experiencing any signs & symptoms of congestion?

- ↑ weight of > 2lbs (1kg) over 2 days, or 5lbs (2.5kg) over a week
  - daily weight should be recorded & taken first thing in the morning, after emptying the bladder, & without clothes on or similar amount of clothes every day
  - a patient can be congested without an ↑ in weight
- new or worsening:
  - edema *
  - shortness of breath at rest or on exertion
  - reduced energy
  - orthopnea (difficulty breathing lying down or reclined)
  - paroxysmal nocturnal dyspnea (waking up short of breath)
  - cough

Physical assessment considerations: elevated jugular venous pressure, pulmonary crackles, edema, S3 heart sounds

* Some ankle edema at the end of the day is normal; elevate the legs for 30 to 60 minutes before bed if the patient experiences nighttime shortness of breath. Compression stockings may be helpful for some; caution in symptomatic heart failure.

Does their bloodwork suggest congestion? Concurrent illness with similar symptoms?

- ↑ NTproBNP / BNP > 30% (ARNI can ↑ BNP initially)
- atrial fibrillation, pneumonia, anemia, COPD, etc

Is the patient taking less diuretic than prescribed?

- explore & address reasons for under-use
- if concerned about incontinence / urgency during outings: suggest taking diuretic when they return home
- if concerned about nocturia: dose diuretic no later than mid-afternoon

Is the patient drinking more than 2 L / day? Consuming too much salt?

- consider all fluids, including soup; recommend decreasing to 2 L of fluid / day
- recommend ≤2g of salt / day when hypervolemic; 20% of ER HF exacerbations are due to sodium indiscretions [1]

Is the patient taking medications that can exacerbate HF?

- e.g. NaCl tablets, NSAIDs, COXIB, corticosteroids, androgens, estrogens: stop or ↓, if possible
- recently started / ↑ β-blocker (transient fluid retention)

Start or Increase Diuretic

- Is the patient on furosemide:
  - if no, start furosemide 20mg to 40mg po once daily
  - if yes, ↑ oral dose by 20mg to 40mg; for example:
    - furosemide 20mg po daily → 40mg po daily
    - furosemide 40mg BID → 60mg in am & 40mg noon
    - furosemide 100mg po BID → 120mg po BID

Reassess in 2 to 7 days

- reassess HF symptoms & bloodwork (renal panel, electrolytes, NTproBNP/BNP); adjust to clinical scenario; e.g.:
  - **if dry weight not achieved or HF symptoms continue** → ↑ by another 20mg to 40mg increments (oral)
    - BID may provide additional benefit, if the extra dose can be remembered & it does not ↓ QoL e.g. housebound
    - if ≥2 increases in furosemide does not provide relief, consider adding metolazone 2.5mg daily x 3 days; some patients will require longer use
  - **if dry weight achieved & HF symptoms resolved**, consider reducing to previous dose
    - some patients may only need a few days of extra furosemide, especially if cause of hypervolemia corrected (e.g. sodium indiscretions, drinking >2L/day)
    - if hypervolemia recurs, may need to maintain the higher furosemide dose; reassess in the future
- higher doses of furosemide may be required in CKD in order to reach the site of action in the nephron
- if hypokalemia or K^+ trending towards lower limit, consider starting / titrating an ACEI, ARB, ARNI or MRA if possible, or starting a K^+ supplement (reassess K^+ regularly)

L.Kosar www.RxFiles.ca © Nov 2020

Acknowledgements: Written by Lynette Kosar BSP, MSc. **Thanks to our contributors & reviewers: Family Physicians**: Tessa Laubscher (Saskatoon). **Heart Failure Pharmacists**: Dr. Sheri Koshman (Alberta), Dr. Arden Barry (British Columbia), Kelsey Dumont (Regina), Lesley Martens (Tisdale), Lisa Rutherford (Prince Albert). **Heart Failure Nurses:** Krista Jelisavac (Saskatoon). **Pharmacists:** Lori Albers (Regina), Brenda Schuster (Regina). **RxFiles Team Members** (alphabetical by surname): Julia Bareham, Debbie Bunka, Alex Crawley, Zack Dumont, Brent Jensen, Margaret Jin, Marlys Lebras, Tahirih McAleer, Jackie Myers, Tanya Nystrom, Loren Regier, Amy Wiebe.

Disclosures: No conflicts of interest are reported by Lynette Kosar

Disclaimer: RxFiles Academic Detailing is part of the College of Pharmacy and Nutrition at the University of Saskatchewan. The content of this work represents the research, experience and opinions of the authors and not those of the University of Saskatchewan. Neither the authors nor the University of Saskatchewan nor any other party who has been involved in the preparation or publication of this work warrants or represents that the information contained herein is accurate or complete, and they are not responsible for any errors or omissions or for the result obtained from the use of such information. Any use of the materials will imply acknowledgment of this disclaimer and release any responsibility of the University of Saskatchewan, its employees, servants or agents. Readers are encouraged to confirm the information contained herein with other sources. Additional information and references online at www.RxFiles.ca Copyright 2020 – RxFiles, University of Saskatchewan www.RxFiles.ca.

References:

1. Tsuyuki RT, McKelvie RS, Arnold JM, Avezum A Jr, Barretto AC, Carvalho AC, Isaac DL, Kitching AD, Piegas LS, Teo KK, Yusuf S. Acute precipitants of congestive heart failure exacerbations. Arch Intern Med. 2001 Oct 22;161(19):2337-42.