

Heart Failure and Diuretics: Tricks of the Trade

The MaineHealth ACO has made reducing heart failure admissions a priority for 2018. In support of this goal, we're pleased to share an article from our partners at the MaineHealth Cardiovascular Service Line authored by Dr. Samuel Coffin, MD, FACC, Board Certified Heart Failure Specialist at Maine Medical Center and the MaineHealth system.

Diuretics are the primary therapies we use to help get our decompensated heart failure patients back to target weight. There is evidence of significant variation in the use of diuretics and the effectiveness of that use. Our goal here is to support an approach that improves care and outcomes for inpatient and outpatient Heart Failure patients.

Trick #1: Maintain diuretic threshold levels.

All loop diuretics have a threshold effect where the kidney loses its ability to increase sodium uptake. If a patient who is fluid overloaded receives 20 mg of Lasix and there is no significant increase in urine output in the next few hours, then you have not reached the threshold needed to increase diuresis in that patient. The best way to diurese a patient is to maintain drug levels above threshold for significant portions of the day, using doses that meet diuretic threshold levels and spreading doses throughout the day.

Trick #2: Understand limitations of furosemide.

Furosemide, or Lasix, is the most commonly used loop diuretic, however it is important that we understand some limitations of this drug. One limitation is that furosemide has a relatively short half-life of 30 – 60 minutes, considerably shorter than the half-life of torsemide, which is 2.5 – 3 hours. That means that a dose of furosemide will have an effect for about 6 hours, while torsemide would be considerably longer. If a patient cannot take twice daily diuretics, or if furosemide has proven ineffective, consider a change to torsemide.

Trick #3: Understand the oral bioavailability of furosemide.

Another limitation of furosemide is that its average oral bioavailability is around 50%, but when given by IV, its bioavailability is close to 100%. The other loop diuretics, bumetanide and torsemide, have better oral absorption and bioavailability. If a patient admitted with decompensated heart failure came to the hospital on furosemide, we try to send them home on either bumetanide or torsemide. Below are the equivalent doses of the different diuretics (for example, an oral dose of 20 mg is equivalent to an oral dose of 10 mg of torsemide which is equal to an oral dose of 0.5 mg of bumetanide).

Furosemide doses below left correspond to Torsemide and Bumetanide doses below:		
Furosemide	Torsemide	Bumetanide
20 mg	10 mg	0.5 mg
40 mg	20 mg	1 mg
60 mg	30 mg	1.5 mg
80 mg – 100 mg	40 mg	2 mg

Trick #4: Efficacy is reduced in renal insufficiency.

In the case of a patient with elevated creatinine, if there is not much of a diuretic effect with the first dose, it may mean that the dose needs to be increased to elicit effective diuresis. There are only so many nephrons remaining in renal insufficiency, and reabsorption in all of them needs to be inhibited to lead to diuresis.

Trick #5: When loop diuretics fail as monotherapy, boost with thiazide diuretics.

Loop diuretics are probably the best way to remove fluid in most cases, but if they fail when used as monotherapy, adding on thiazide diuretics that work more distally in the nephron can be extremely helpful in removing fluid. These supplemental diuretics, including metolazone and chlorothiazide, are often used in the hospital in addition to loop diuretics to boost diuresis. Generally, we either use oral metolazone or IV chlorothiazide, dosed 30 minutes prior to loop diuretics.

Trick #6: When using thiazides, especially on an outpatient basis, beware electrolyte abnormalities and renal dysfunction, and check labs frequently.

When using these supplemental thiazide diuretics, we watch for potential complications including acute kidney injury, hypokalemia, hypomagnesemia, and hyponatremia. On an outpatient basis, we recommend weekly or twice weekly laboratory testing to help prevent harm from these complications, as well as prophylactic supplementation of both magnesium and potassium.

Conclusion: In summary, setting a target weight, where the patient is at about the right level of fluid, and keeping a patient close to that target weight, are keys to improving their health and quality of life. Diuretics are the primary tools to help maintain that target weight in combination with appropriate fluid and salt oral intake. It is our hope that the strategies outlined above will support you in ensuring the best health outcomes for the heart failure patients in your care.

About the Author:

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