Guidelines for Continuous Infusion Bumetanide

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Loop diuretics are among the most frequently used medications in the intensive care unit. Specifically, both bumetanide and furosemide are widely used by physicians in patients requiring diuresis for a variety of indications. These indications include, but are not limited to, heart failure exacerbations and acute renal failure.\textsuperscript{1,2} A review of the primary literature regarding continuous infusion bumetanide results in a very vague definition of the maximum effective or therapeutic dose. Although the package insert recommends not exceeding 10mg per day, many patients on continuous infusion bumetanide received total doses much higher than 10 mg per day.\textsuperscript{3} Additionally, Howard, et.al. noted that many patients developed severe musculoskeletal pain and cramping at infusion rates greater than or equal to 2 mg/hr.\textsuperscript{4}

Following a review of 85 patients who received continuous infusion bumetanide (CIB) over a one-year period at the University of Kentucky’s Chandler Medical Center, it was noted that there was great variation in initiation, titration and discontinuation. Patients who were on CIB for heart failure averaged initial doses of ~1mg/hr without bolus doses. Patients who were on CIB for acute renal failure averaged initial doses of 1.7 mg/hr with bolus doses of approximately 5mg. Patients with heart failure averaged 1.7 days of therapy, whereas patients with acute renal failure averaged three days of therapy.

Following completion of this evaluation, a set of guidelines addressing the use of CIB at the University of Kentucky Chandler Medical Center was developed. These guidelines were approved by the P & T Committee in the fall of 2003 (see next page).

References
3. Bumetanide. AHFS Drug Information, 2002
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Bumetanide Continuous Infusion

Heart Failure

Indication: Heart failure exacerbation resistant to intermittent IV or oral diuretics

Initial Dosage: † 0.25-0.5 mg/hr IV

Maximum 4 mg/hr – limit to 2-4 hours

Titration:
• Increments of 0.25-0.5 mg/hr
• Allow one hour between each dose change
• Titrate to the lowest effective dose
• Begin weaning as soon as effect achieved

Discontinuation:
1. If no increase in urine output (UOP) after 4 hours
2. If patient has achieved adequate diuresis: Outputs > Inputs x 48 hours

Contraindications/Cautions:
1. Not to be used with concomitant oral diuretics
2. Severe hypokalemia (K < 2.8), hypomagnesemia (Mag < 1.5), hyperuricemia (Uric acid > 7)
3. Caution with aminoglycosides (increased renal and ototoxicity)

Monitoring:
1. Baseline basic metabolic panel (BMP), uric acid, lactate, ionized calcium (iCa), magnesium (Mag), phosphorus (Phos), creatine kinase (CK)
2. Daily BMP, magnesium
3. UOP q1h while on continuous infusion bumetanide
4. Strict daily Inputs and Outputs
5. Pain scale to assess for musculoskeletal pain (1-10)

†Convert from Furosemide: 40mg furosemide = 1 mg bumetanide
Convert from Torsemide: 20mg torsemide = 1 mg bumetanide

Oliguric Renal Failure

Indication: Oliguric renal failure prior to the use of renal replacement therapy (RRT)

Initial Dosage: † 0.5-1 mg/hr IV

Maximum 4 mg/hr - limit to 2-4 hours

Titration:
• Increments of 0.25-0.5 mg/hr
• Allow one hour between each dose change
• Titrate to the lowest effective dose
• Begin weaning as soon as effect achieved

Discontinuation:
1. If no increase in UOP after 4 hours
2. If patient has achieved adequate diuresis: Outputs > Inputs x 48 hours
3. Initiation of RRT [e.g. hemodialysis (HD), continuous venovenous hemodialysis (CVVHD)]
4. Return of non-oliguria

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