FUROSEMIDE

Class: Diuretic, Loop

Indications: Management of edema associated with heart failure and hepatic or renal disease; acute pulmonary edema; treatment of hypertension (alone or in combination with other antihypertensives)

Available dosage form in the hospital: 40MG TAB, 20MG AMP, 4MG/ML SYRUP, 10MG/ML SYRUP (5MG/5ML)

Dosage:

-Edema, heart failure:

-*Oral:* Initial: 20-80 mg/dose; if response is not adequate, may repeat the same dose or increase dose in increments of 20-40 mg/dose at intervals of 6-8 hours; may be titrated up to 600 mg/day with severe edematous states; usual maintenance dose interval is once or twice daily. **Note:** Dosing frequency may be adjusted based on patient-specific diuretic needs.

-*I.M., I.V.:* Initial: 20-40 mg/dose; if response is not adequate, may repeat the same dose or increase dose in increments of 20 mg/dose and administer 1-2 hours after previous dose (maximum dose: 200 mg/dose). Individually determined dose should then be given once or twice daily although some patients may initially require dosing as frequent as every 6 hours. **Note:** ACC/AHA 2009 guidelines for heart failure recommend a maximum single dose of 160-200 mg.

-*Continuous I.V. infusion (Howard, 2001; Hunt, 2009):* Initial: I.V. bolus dose 20-40 mg over 1-2 minutes, followed by continuous I.V. infusion doses of 10-40 mg/hour. If urine output is <1 mL/kg/hour, double as necessary to a maximum of 80-160 mg/hour. The risk associated with higher infusion rates (80-160 mg/hour) must be weighed against alternative strategies. **Note:** ACC/AHA 2009 guidelines for heart failure recommend 40 mg I.V. load, then 10-40 mg/hour infusion.

-Acute pulmonary edema: *I.V.:* 40 mg over 1-2 minutes. If response not adequate within 1 hour, may increase dose to 80 mg. **Note:** ACC/AHA 2009 guidelines for heart failure recommend a maximum single dose of 160-200 mg.

Hypertension, resistant: *Oral:* 20-80 mg/day in 2 divided doses

Refractory heart failure: *Oral, I.V.:* Doses up to 8 g/day have been used.

Geriatric

Oral, I.M., I.V.: Initial: 20 mg/day; increase slowly to desired response.

Renal Impairment:

Acute renal failure: Doses up to 1-3 g/day may be necessary to initiate desired response; avoid use in oliguric states.

Not removed by hemo- or peritoneal dialysis; supplemental dose is not necessary.

Hepatic Impairment:

Diminished natriuretic effect with increased sensitivity to hypokalemia and volume depletion in cirrhosis. Monitor effects, particularly with high doses.

Common side effect: Cardiovascular: Acute hypotension, chronic aortitis, necrotizing angiitis, orthostatic hypotension, vasculitis

Central nervous system: Dizziness, fever, headache, hepatic encephalopathy, lightheadedness, restlessness, vertigo. Dermatologic: Bullous pemphigoid, cutaneous vasculitis, drug rash with eosinophilia and systemic symptoms (DRESS), erythema multiforme, exanthematous pustulosis (generalized), exfoliative dermatitis, photosensitivity, pruritus, purpura, rash, Stevens-Johnson syndrome, toxic epidermal necrolysis, urticaria . Endocrine & metabolic: Cholesterol and triglycerides increased, glucose tolerance test altered, gout, hyperglycemia, hyperuricemia, hypocalcemia, hypochloremia, hypokalemia, hypomagnesemia, hyponatremia, metabolic alkalosis

Gastrointestinal: Anorexia, constipation, cramping, diarrhea, nausea, oral and gastric irritation, pancreatitis, vomiting . Genitourinary: Urinary bladder spasm, urinary frequency

Pregnancy Risk Factor: C