MONOGRAPH

Furosemide (Frusemide)

Scope (Staff):	Medical, Pharmacy, Nursing, Anaesthetic Technicians
Scope (Area):	All Clinical Areas

Child Safe Organisation Statement of Commitment

CAHS commits to being a child safe organisation by applying the National Principles for Child Safe Organisations. This is a commitment to a strong culture supported by robust policies and procedures to reduce the likelihood of harm to children and young people.

This document should be read in conjunction with this DISCLAIMER

QUICKLINKS

Dosage/Dosage Adjustments | Administration | Compatibility | Monitoring

DRUG CLASS

Loop diuretic [1]

INDICATIONS AND RESTRICTIONS[1-4]

- Treatment of oedema resulting from cardiac, renal or hepatic disease
- Oliguria and renal failure
- Hypertension
- Emergency treatment of pulmonary oedema and cerebral oedema

CONTRAINDICATIONS[1-3]

- Hypersensitivity to furosemide or any component of the formulation.
- Hypersensitivity to sulphonamides – may show cross-sensitivity to furosemide.
- Anuria
- Severe electrolyte disturbances and fluid depletion
- Jaundiced infants or infants with conditions which might induce hyperbilirubinaemia or kernicterus

PRECAUTIONS

- Ototoxicity - When used in combination with ototoxic drugs, rapid intravenous infusion, severe renal impairment, hypoproteinaemia [1, 2, 4, 5]
- When used in combination with potassium-lowering drugs – risk of hypokalaemia, monitor serum potassium level closely [1]
- When used in combination with nephrotoxic drugs – increased risk of nephrotoxicity, especially with renal impairment [1]
- Patients with obstruction of urinary outflow – can cause acute urinary retention [1, 2]
- Hypotension, hypovolaemia, and significant electrolyte imbalances should be corrected before initiation of treatment with furosemide [2]
- Diabetes – May impair glucose tolerance [3]

FORMULATIONS

Listed below are products available at PCH, other formulations may be available, check with pharmacy if required:

- Furosemide ampoules: 20 mg/2 mL, 250 mg/25 mL
- Furosemide tablets: 20 mg, 40 mg
- Furosemide oral solution: 10 mg/mL

Note Lasix® oral liquid contains 12.7% ethanol.[3] Tablets can be used where the risk of chronic alcohol exposure is a concern.

Imprest location: Formulary One

DOSAGE, DOSAGE ADJUSTMENTS & ADMINISTRATION

Neonates: Refer to Neonatal Medication Protocols

Children ≥ 4 weeks:

Oral: 0.5–2 mg/kg/dose every 6–12 hours. If response is not adequate after 6–8 hours, the dose may be increased by 1–2 mg/kg/dose, up to a maximum of 6 mg/kg/dose. Once diuresis is satisfactory, adjust to the lowest effective dose [2, 5, 6]

Intermittent intravenous infusion or Intramuscular Injection: 0.5–2 mg/kg/dose every 6–12 hours as required. If response is not adequate after 2 hours, the dose may be increased by 1 mg/kg/dose, up to a maximum of 6 mg/kg/dose [4-6]

Continuous Intravenous Infusion: 0.05–0.5 mg/kg/hour (up to 1 mg/kg/hr); start at a lower rate and titrate to effect [5]

Renal impairment:

- Higher and/or more frequent initial doses may be needed. [2] Monitor fluid balance and electrolytes closely. [4] Limit intermittent intravenous infusion rate to 2.5 mg/minute. [3]
- eGFR calculator

Hepatic impairment:

- No dosage adjustments are required. Use with caution in patients with cirrhosis since imbalances of fluid and electrolyte may precipitate hepatic encephalopathy. [4, 6]

ADMINISTRATION

Intermittent intravenous infusion:

- May be administered undiluted or may be diluted to a convenient volume for administration.
- Infuse over at least 15 minutes, at a maximum rate of 0.5 mg/kg/min, or 4 mg/min, whichever is less. [2,7]
- Faster infusion rates may result in tinnitus, vertigo, and deafness, especially with high doses, in combination with other ototoxic drugs or in renal impairment [7]. Limit intermittent intravenous infusion rate to 2.5 mg/minute in renal impairment. [3]

Continuous Intravenous Infusion:

Patient's Weight	Concentration	Notes
10 kg or less	60 mg in 30 mL (2 mg/mL)	In a 3 kg patient 0.1 mg/kg/hr = 0.15 mL/hour
Above 10 kg	250 mg in 50 mL (5 mg/mL)	In a 20 kg patient, 0.1 mg/kg/hr = 0.4 mL/hour

Intramuscular Injection:
May be administered undiluted in exceptional circumstances where oral or intravenous administration is not feasible. Intramuscular injection is not suitable for acute conditions like pulmonary oedema. [3, 7]

COMPATIBILITY *(LIST IS NOT EXHAUSTIVE)*

Compatible fluids: Glucose 5%, Hartmann's solution, sodium chloride 0.9%[7]

Compatible at Y-site: Plasma-Lyte 148

Only commonly used drugs are listed below. This is not a complete list of incompatible drugs. Compatibilities of IV drugs must be checked when two or more drugs are given concurrently.

INCOMPATIBLE drugs [4,7]:

Amiodarone, atracurium, caspofungin, diazepam, dobutamine, droperidol, fluconazole, gentamicin, ketamine, labetalol, midazolam, milrinone, morphine, mycophenolate mofetil, noradrenaline, ondansetron, pantoprazole, sulfamethoxazole/trimethoprim, tacrolimus, thiamine, vancomycin, vasopressin, vecuronium.

MONITORING [1,6]

- Serum electrolytes
- Fluid balance

- Blood pressure
- Weight – for heart failure
- Renal function and urine output
- Hearing (higher doses or extended treatment)

ADVERSE EFFECTS [1]

Common: Electrolyte disturbances, dehydration, metabolic alkalosis, increased serum creatinine, hyperuricaemia, gout, dizziness, orthostatic hypotension, syncope

Infrequent: dyslipidaemia, rash

Rare: tinnitus, vertigo, deafness (especially with rapid IV administration), acute pancreatitis, jaundice, thrombocytopenia, haemolytic anaemia, agranulocytosis, interstitial nephritis, exfoliative dermatitis, Stevens-Johnson syndrome, bullous eruptions

STORAGE

- Store ampoules, tablets, and Lasix® oral solution below 25°C, protect from light [3].
- Store the alcohol-free suspension between 2-8°C.
- Crystals may form in ampoules at low temperatures and can be dissolved when warmed to 40°C [7].

Do not use IV solutions that are yellow or contain particulate matter. [7]

INTERACTIONS

This medication may interact with other medications; consult PCH approved references (e.g. Clinical Pharmacology), a clinical pharmacist or PCH Medicines Information Service on extension 63546 for more information.

Please note: The information contained in this guideline is to assist with the preparation and administration of **Furosemide**. Any variations to the doses recommended should be clarified with the prescriber prior to administration

References

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7. Burridge N, Collard N, Symons K, et al. Australian injectable drugs handbook. 9th Edition ed. Collingwood, Vic.: The Society of Hospital Pharmacist of Australia; 2024 [cited 16/07/2024]. Available from: https://aidh-hcn-com-au.pklibresources.health.wa.gov.au/browse/f/furosemide

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