bumetanide (byoo-met-a-nide)

**Diuretics**

**Therapeutic:**

**Pharmacologic:** loop diuretics

**Pregnancy Category C**

**Indications**

Edema due to heart failure, hepatic disease, or renal impairment.

**Unlabeled Use:**

Reversal of oliguria in preterm neonates.

**Action**

Inhibits the reabsorption of sodium and chloride from the loop of Henle and distal renal tubule. Increases renal excretion of water, sodium chloride, magnesium, potassium, and calcium. Effectiveness persists in impaired renal function.

**Therapeutic Effects:**

Diuresis and subsequent mobilization of excess fluid (edema, pleural effusions).

**Pharmacokinetics**

**Absorption:** Well absorbed after oral or IM administration.

**Distribution:** Widely distributed.

**Protein Binding:** 72–96%.

**Metabolism and Excretion:** Partially metabolized by liver; 50% eliminated unchanged by kidneys and 20% excreted in feces.

**Half-life:** 60–90 min (6 hr in neonates).

**TIME/ACTION PROFILE (diuretic effect)**

<table>
<thead>
<tr>
<th>_route</th>
<th>effect</th>
<th>peak</th>
<th>duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO</td>
<td>0.5–2 mg/day given in 1–2 doses; titrate to desired response (maximum daily dose = 10 mg/day).</td>
<td>1–2 hr</td>
<td>4–6 hr</td>
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<tr>
<td>IM, IV</td>
<td></td>
<td>2–3 min</td>
<td>15–45 min</td>
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**Contraindications/Precautions**

**Contraindicated in:** Hypersensitivity. Cross-sensitivity with thiazides and sulfonylureas may occur. Hepatic coma or anuria.

**Use Cautiously in:** Severe liver disease (may precipitate hepatic coma; concurrent use with potassium-sparing diuretics may be necessary); Electrolyte depletion; Diabetes mellitus; Increasing azotemia; Lactation, Pedi: Safety not established; bumetanide is a potent displacer of bilirubin and should be used cautiously in critically ill or jaundiced neonates because of risk of kernicterus; Injection contains benzyl alcohol, which may cause gasping syndrome in neonates; Geri: May be at increased risk of side effects, especially hypotension and electrolyte imbalance, at usual doses.

**Adverse Reactions/Side Effects**

**CNS:** dizziness, encephalopathy, headache.

**EENT:** hearing loss, tinnitus.

**CV:** hypotension.

**GI:** diarrhea, dry mouth, nausea, vomiting.

**GU:** BUN, excessive urination.

**Derm:** STEVENS-JOHNSON SYNDROME, TOXIC EPIDERMAL NECROLYSIS, photosensitivity, pruritis, rash.

**Endo:** hyperglycemia, hyperuricemia.

**F and E:** dehydration, hypocalcemia, hypochloremia, hypokalemia, hypomagnesemia, hyponatremia, hypovolemia, metabolic alkalosis.

**MS:** arthralgia, muscle cramps, myalgia.

**Interactions**

**Drug-Drug:**

Increased risk of hypotension with antihypertensives, nitrates, or acute ingestion of alcohol.

Increased risk of hypokalemia with other diuretics, amphotericin B, stimulant laxatives, and corticosteroids. Hypokalemia may ↑ risk of digoxin toxicity. ↑ lithium excretion, may cause lithium toxicity. ↑ risk of ototoxicity with aminoglycosides. NSAIDS may affect effects of bumetanide.

**Route/Dosage**

**PO (Adults):** 0.5–2 mg/day given in 1–2 doses; titrate to desired response (maximum daily dose = 10 mg/day).

**PO (Infants and Children):** 0.015–0.1 mg/kg/dose every 6–24 hrs (maximum: 10 mg/day).

**PO (Neonates):** 0.01–0.05 mg/kg/dose every 12–24 in term neonates or every 24–48 hrs in preterm neonates.

**IM, IV (Adults):** 0.5–1 mg/dose, may repeat q 2–3 hr as needed (up to 10 mg/day).

**IM, IV (Infants and Children):** 0.015–0.1 mg/kg/dose every 6–24 hrs (maximum: 10 mg/day).

**IM, IV (Neonates):** 0.01–0.05 mg/kg/dose every 12–24 in term neonates or every 24–48 hrs in preterm neonates.
NURSING IMPLICATIONS

Assessment
- Assess fluid status during therapy. Monitor daily weight, intake and output ratios, amount and location of edema, lung sounds, skin turgor, and mucous membranes. Notify health care professional if edema is noted in dependent areas or if edema is not improving.
- Monitor fluid intake and output ratios and weight weekly. A sudden decrease in output or weight gain may indicate fluid accumulation.
- Assess blood pressure and pulse before and during administration. Monitor frequency of prescription refills to determine compliance.
- Assess patients receiving digoxin for anorexia, nausea, vomiting, muscle cramps, paraesthesia, and confusion. Notify health care professional if any of these symptoms occur.
- Assess for allergy to sulfonamides.
- Assess patient for skin rash frequently during therapy. Discontinue bumetanide at first sign of rash; may be life-threatening. Stevens-Johnson syndrome or toxic epidermal necrolysis may develop. Treat symptomatically; may recur once treatment is stopped.

Potential Nursing Diagnoses
- Excess fluid volume (Indications)
- Risk for deficient fluid volume (Side Effects)

Implementation
- PO: May be taken with food to minimize gastric irritation.
- IV: Administer undiluted. Rate: Administer slowly over 1–2 min.
- Continuous Infusion: Administer undiluted drug. Rate: Infuse over 5 min. May be administered over 12 hr for patients with renal impairment.
- IV Administration
  - Direct IV: Diluent: Administer undiluted. Concentration: Not to exceed 0.25 mg/mL. Rate: Administer slowly over 1–2 min.
  - Continuous Infusion: Diluent: May dilute in D5W or 0.9% NaCl. Rate: Infuse over 15 min. May be administered over 12 hr for patients with renal impairment.

Pharmacokinetics
- Bumetanide is well absorbed orally. Peak plasma concentrations occur 1–2 hr after oral administration.
- Bumetanide is highly protein-bound. It is metabolized by the liver and excreted in the urine as unchanged drug and metabolites.

Side Effects
- Headache, dizziness, insomnia, gastrointestinal disturbances, tremors, drowsiness, depression, nausea, vomiting, diarrhea, anorexia, jaundice, and renal impairment.
- Potassium depletion, hyperkalemia, hypocalcemia, hypomagnesemia, elevated blood pressure, and decreased serum sodium concentrations.
- Allergic reactions, including rash, fever, and urticaria.

Contraindications
- Bumetanide is contraindicated in patients with a history of anuria or severe renal impairment, hyperkalemia, or hypokalemia.

Precautions
- Use with caution in patients with renal impairment, hepatic impairment, or history of seizures.
- Monitor serum electrolyte levels and renal function periodically.
- Use with caution in patients with a history of gastrointestinal bleeding.

Interactions
- Bumetanide may enhance the effects of other diuretics, such as furosemide and ethacrynic acid.
- Bumetanide may potentiate the effects of other drugs that increase diuresis, such as amphotericin B and rifampin.
- Bumetanide may decrease the effects of other drugs, such as methotrexate and warfarin.

Monitoring Parameters
- Monitor serum electrolyte levels and renal function periodically.
- Monitor blood pressure and pulse before and during administration.
- Monitor frequency of prescription refills to determine compliance.

References

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bumetanide

DOSE RANGE: 1 to 10 mg/day as a single dose or in divided doses.

CONTRAINDICATIONS:.Modules with a serum creatinine level > 6 mg/dL; severe hepatic failure; severe hypovolemia; overt cardiac decompensation

CAUTIONS: Hypovolemia (monitoring of heart rate, blood pressure, and urine output is necessary); progressive renal failure; sucralfate; angiotensin-converting enzyme inhibitors; patients with diabetes mellitus and hypokalemia; first trimester of pregnancy; lactation

INTERACTIONS: Diuretics (potentially additive hypotensive effect); potassium-sparing diuretics (potassium accumulation); potassium chloride; digoxin (potentially increased serum digoxin concentrations); cyclosporine, tacrolimus (nephrotoxicity); aminoglycosides (potential ototoxicity); amphotericin B colloid (potentially additive hypotensive effect); theophylline (potentially increased serum theophylline concentrations); lithium (potentially increased serum lithium levels); nonsteroidal anti-inflammatory drugs (potential additive hypotensive effect)

SIDE EFFECTS: Hypotension; dizziness; headache; malaise; edema; nausea; vomiting; diarrhea; anorexia; increased thirst; weakness; electrolyte abnormalities; hyperkalemia; hypomagnesemia; hypocalcemia; proteinuria; dysuria; hematuria; rhabdomyolysis; allergic reactions; anaphylaxis; pancreatitis; hepatitis; bone marrow suppression; jaundice; hemolytic anemia; agranulocytosis; aseptic meningitis; eosinophilia; St. John’s wort

DOSE MODIFICATIONS: Increase dose gradually in elderly patients

FERTILITY: None

PREGNANCY: Category C; avoid use in first trimester

LACTATION: Avoid breastfeeding

PEDIATRICS: Safety and efficacy not established for infants and children

GERIATRICS: Increased risk of adverse effects; monitor closely

PATIENT/FAMILY TEACHING

- Instruct patient to take bumetanide as directed. Take missed doses as soon as possible; do not double doses.
- Caution patient to change positions slowly to minimize orthostatic hypotension.
- Caution patient that drinking alcohol, exercising during hot weather, or standing for long periods may enhance orthostatic hypotension.
- Instruct patient to consult health care professional regarding a diet high in potassium.
- Advise patient to contact health care professional if gain of more than 3 lbs in one day is experienced.
- Instruct patient to notify health care professional of medication regimen before treatment or surgery.
- Caution patient to use sunscreen and protective clothing to prevent photosensitivity reactions.
- Advise patient to contact health care professional immediately if rash, muscle weakness, cramps, nausea, dizziness, numbness, or tingling of extremities occurs.
- Advise patients with diabetes to monitor blood glucose closely; may cause increased levels.
- Emphasize the importance of routine follow-up examinations.
- Caution older patients or their caregivers about increased risk for falls. Suggest strategies for fall prevention.

EVALUATION/DESIRABLE OUTCOMES

- Decrease in edema.
- Decrease in abdominal girth and weight.
- Increase in urinary output.

Why was this drug prescribed for your patient?