benazepril (ben-aye-pril)

**Lanin**

**Therapeutic: antihypertensives**

**Pharmacologic: ACE inhibitors**

**Pregnancy Category D**

### Indications

Use alone or with other agents in the management of hypertension.

### Action

Angiotensin-converting enzyme (ACE) inhibitors block the conversion of angiotensin I to the vasoconstrictor angiotensin II. ACE inhibitors also prevent the degradation of bradykinin and other vasodilatory prostaglandins. ACE inhibitors also lower plasma renin and aldosterone levels. Net result is systemic vasodilation.

### Therapeutic Effects

Lowering of BP in patients with hypertension.

### Pharmacokinetics

**Absorption:** 37% absorbed after oral administration.

**Distribution:** Crosses the placenta; enters breast milk in small amounts.

**Protein Binding:** 95%.

**Metabolism and Excretion:** Converted by the liver to benazeprilat, the active metabolite; 20% excreted in urine; 11–12% nonrenal (biliary) elimination.

**Half-life:** Benazeprilat: 10–11 hr.

### TIME/ACTION PROFILE (antihypertensive effect)

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO</td>
<td>within 1 hr*</td>
<td>1–2 wks†</td>
<td>24 hr†</td>
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*After single dose
†Chronic dosing

### Contraindications/Precautions

Contraindicated in: Hypersensitivity; History of angioedema with or without previous use of ACE inhibitors; Concurrent use with aliskiren in patients with diabetes or moderate-to-severe renal impairment (GFR < 60 mL/min); OB: Can cause injury or death of fetus— if pregnancy occurs, discontinue immediately; Lactation: Discontinue drug or formula.

Use Caution: Pts with renal impairment, hypovolemia, and concurrent diuretic therapy; Black patients (intermediate for hypertension less effective, may require additional therapy; higher risk of angioedema); Surgery/anesthesia (hypotension may be exaggerated). PO pts: Children < 6 yr (safety not established). Genit: Initial dose recommended.

### Exercise Extreme Care in:

Family history of angioedema.

### Adverse Reactions/Side Effects

**CNS:** Dizziness, drowsiness, fatigue, headache.

**Resp:** Cough.

**CV:** Hypotension.

**GI:** Nausea.

**GU:** Impaired renal function.

**Derm:** Rash.

**F and E:** Hyperkalemia.

**Misc:** Angioedema.

### Interactions

**Drug-Drug:** Excessive hypotension may occur with concurrent use of diuretics. Additive hypotension with other antihypertensives. Risk of hyperkalemia with concurrent use of potassium supplements, potassium-sparing diuretics, or potassium-containing salt substitutes. Risk of hyperkalemia, renal dysfunction, hypotension, and syncope with concurrent use of angiotensin II receptor antagonists or aliskiren; avoid concurrent use with diuretics or angiotensin II receptor antagonists or aliskiren in patients with diabetes or GFR < 60 mL/min. NSAIDs and selective COX-2 inhibitors may blunt the antihypertensive effect and risk of renal dysfunction. Levels and risk of digitalis toxicity.

### Route/Dosage

**PO (Adults):** 10 mg once daily; gradually to maintenance dose of 20–40 mg/day in 1–2 divided doses (initiate therapy at 5 mg once daily in patients receiving diuretics).

**PO (Children ≥ 6 yr):** 0.2 mg/kg once daily; may be titrated up to 0.6 mg/kg/day (or 40 mg/day).

### Renal Impairment

**PO (Adults):** CCr ≤ 30 mL/min —— Discontinue therapy with 5 mg once daily.

**PO (Children ≥ 6 yr):** CCr ≤ 30 mL/min —— Contraindicated.
**NURSING IMPLICATIONS**

**Assessment**
- Monitor BP and pulse frequently during initial dose adjustment and periodically during therapy. Notify health care professional of significant changes.
- Monitor frequency of prescription refills to determine adherence.
- Assess patient for signs of angioedema (dyspnea, facial swelling).
- Lab Test Considerations: Monitor renal function. May cause ↑ BUN and serum creatinine.
- May cause hyperkalemia.
- Monitor CBC periodically during therapy in patients with collagen vascular disease and/or renal disease. May rarely cause slight ↓ in hemoglobin as well as leukopenia and eosinophilia.
- May cause ↑ AST, ALT, alkaline phosphatase, serum bilirubin, uric acid, and glucose.

**Potential Nursing Diagnoses**
- Decreased cardiac output (Indications) (Side Effects)
- Noncompliance (Patient/Family Teaching)

**Implementation**
- Do not confuse benazepril with Benadryl.
- Correct volume depletion, if possible, before initiation of therapy. Precipitous drop in BP during first 1–3 hr after first dose may require volume expansion with normal saline but is not normally considered an indication for stopping therapy. Discontinuing diuretic therapy or cautiously increasing salt intake 2–3 days before initiation may decrease risk of hypotension. Monitor closely for at least 1 hr after BP has stabilized. Renal function of DHP is not controlled.
- PO: For patients with difficulty swallowing tablets, pharmacist can compound an oral suspension; stable for 30 days if refrigerated. Shake suspension before each use.

**Patient/Family Teaching**
- Instruct patient to take medication as directed at the same time each day, even if feeling well. Take missed doses as soon as remembered but not if almost time for next dose. Do not double doses. Warn patient to discontinue benazepril unless directed by healthcare professional.
- Encourage patient to comply with additional interventions for hypertension (weight reduction, low sodium diet, discontinuation of smoking, moderation of alcohol consumption, regular exercise, and stress management). Medication controls but does not cure hypertension.
- Instruct patient and family on corrected ranges for monitoring BP. Advise them to check BP at least weekly and to report significant changes to healthcare professional.
- Caution patient to avoid salt substitutes containing potassium, or foods containing high levels of potassium or sodium unless directed by healthcare professional.
- Caution patient to change positions slowly to minimize hypotension. Use of alcohol, standing for long periods, exercising, and hot weather may increase orthostatic hypotension.
- Instruct patient to notify health care professional of all Rx or OTC medications, vitamins, herbal products, being taken and consult health care professional before taking any new medications, especially cough, cold, or allergy remedies.
- May cause dizziness. Caution patient to avoid driving and other activities requiring alertness until response to medication is known.
- Advise patient to inform healthcare professional of medication regimen before treatment or surgery.
- Instruct patient to notify health care professional if rash; mouth sores; sore throat; fever; swelling of hands or feet; irregular heartbeat; chest pain; dry cough; hoarseness; swelling of face, eyes, lips, or tongue; or if difficulty swallowing or breathing occurs. Persistent dry cough may occur and may not subside until medication is discontinued. Consult healthcare professional if cough becomes bothersome. Also notify healthcare professional if nausea, vomiting, or diarrhea occurs and continues.
- Advise women of childbearing age to use contraception and notify health care professional if pregnancy is planned or suspected.
- Emphasize the importance of follow-up examinations to evaluate effectiveness of medication.

**Evaluation/Desired Outcomes**
- Decrease in BP without appearance of excessive side effects.
- Why was this drug prescribed for your patient?