Captopril (kap-toe-pril)

Classification
Therapeutic: antihypertensives
Pharmacologic: ACE inhibitors

Pregnancy Category D

Indications

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 decrease plasma renin levels and aldosterone levels. Net result is systemic vasodilation. Therapeutic Effects: Lowering of BP in patients with hypertension. Improved survival and reduced symptoms in patients with heart failure. Improved survival and reduced development of overt heart failure after myocardial infarction. Decreased progression of diabetic nephropathy with decreased need for transplantation or dialysis.

Pharmacokinetics
Absorption: 60–75% absorbed following oral administration (decreased by food).
Distribution: Crosses the placenta; enters breast milk in small amounts.
Metabolism and Excretion: 50% metabolized by the liver to inactive compounds, 50% excreted unchanged in urine.
Half-life: Infants with HF: 3.3 hr (range 1.2–12.4 hr); Children: 1.5 hr (range 0.98–2.3 hr); Adults: 1.9 hr (to 20–40 hr in renal impairment); Adults with HF: 2.1 hr.

TIME/ACTION PROFILE (effect on BP—single dose†)

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO</td>
<td>15–60min</td>
<td>60–90min</td>
<td>6–12hr</td>
</tr>
</tbody>
</table>

Full effects may not be noted for several weeks.

Contraindications/Precautions
Contraindicated in: Hypersensitivity; History of angioedema with previous use of ACE inhibitors; Concurrent use with aliskiren in patients with diabetes or moderate-to-severe renal impairment (CrCl <60 mL/min); OIH: Can cause injury or death of fetus — if pregnancy occurs, discontinue immediately; Cautions: Discontinue drug on use formula.

Use Cautiously in: Patients with collagen vascular disease, renal impairment, hypovolemia, hyponatremia, and concurrent diuretic therapy; Surgery/anesthesia (hypotension may be exaggerated); Black patients (monotherapy for hypertension less effective, may require additional therapy; higher risk of angioedema); Women of childbearing potential; Geri: Initial dose recommended. Exercises Extreme Caution in: History of angioedema.

Adverse Reactions/Side Effects

Interactions
Drug-Drug: Excessive hypotension may occur with concurrent use of diuretics. Additive hypotension with other antihypertensives. Risk of hypotension with concurrent use of potassium supplements, potassium-sparing diuretics, or potassium-containing salt substitutes. Risk of hyperkalemia, renal dysfunction, hypertension, and edema with concurrent use of angiotensin II receptor antagonists or aliskiren; avoid concurrent use with aliskiren in patients with diabetes or CrCl <60 mL/min. NSAIDs and selective D2 inhibitors may blunt the anti-hypertensive effect and ↑ the risk of renal dysfunction. Risk of hyperkalemia with selective COX-2 inhibitors and NSAIDs. Drug-Natural Products: Avoid natural licorice (causes sodium and water retention and increases potassium loss).
**Drug-Food:** Food significantly \( \downarrow \) absorption. Administer captopril 1 hr before meals.

**Route/Dosage**

Note: The lower doses (1/2 of those listed) in patients who are sodium and water depleted due to diuretics.

**Hypertension**

PO (Adults and Adolescents): 12.5–25 mg 2–3 times daily, may be \( \uparrow \) to 1–2 wk intervals up to 150 mg 3 times daily (initiate therapy with 6.25–12.5 mg 2–3 times daily in patients recovering from surgery).

**Heart Failure**

PO (Adults): 25 mg 3 times daily (0.25–12.5 mg 3 times daily in patients who have been vigorously diuresed); titrate up to a maximum of 60 mg/day in 2–4 divided doses (older adults: 0.25–1.25 mg/dose q 12–24 hr; titrate up to a maximum of 60 mg/day in 2–4 divided doses).

PO (Infants): 0.15–0.5 mg/kg/dose (titrate up to a maximum of 6 mg/kg/day in 1–2 divided doses).

PO (Neonates): 0.05–0.1 mg/kg/dose q 8–24 hr (may \( \uparrow \) as needed up to 0.5 mg/kg q 24 hr; premature neonates: 0.05 mg/kg/q 8–12 hr).

**Left Ventricular Dysfunction Post-MI**

PO (Adults): 6.25 mg not done, followed by 12.5 mg 3 times daily, may be \( \uparrow \) to 30 mg 3 times daily.

**Diabetic Nephropathy**

PO (Adults): 25 mg 3 times daily.

**Renal Impairment**

PO (Adults): ClCr < 10 mL/min: Administer 75% of dose; ClCr < 10 mL/min: Administer 50% of dose.

**NURSING IMPLICATIONS**

**Assessment**

- **Hypertension:** Monitor BP and pulse frequently during initial dose adjustment and periodically during therapy. Notify health care professional of significant changes.
- **Heart Failure:** Monitor weight and assess patient routinely for resolution of edema.
- **Drug-Drug Considerations:** Monitor renal function. May \( \uparrow \) BUN and serum creatinine concentrations; may require dose reduction or withdrawal.
- **Potential Nursing Diagnoses**
  - **Decreased cardiac output (Indications)/Side Effects**
  - **Noncompliance (Patient/Family Teaching)**

**Implementation**

- **Do not confuse captopril with carvedilol.**
- **Correct volume depletion, if possible, before initiation of therapy due to possible precipitous drop in BP during first 1–3 hr following first dose.** Both allopurinol and captopril may be discontinued by discontinuing diuretics or cautiously increasing salt intake 2–3 days prior to beginning captopril. Monitor BP closely. Resume diuretics if BP is not controlled.
- **PO:** Administer 1 hr before meals or 2 hr after meals. May be crushed if patient has difficulty swallowing. Tablets may have a sulfurous odor.
- **Potential Nursing Diagnoses**
  - **Decreased cardiac output (Indications)/Side Effects**
  - **Noncompliance (Patient/Family Teaching)**

**Patient/Family Teaching**

- Instruct patient to take captopril 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.
CONTINUED

captopril

do not double doses. Warn patient not to discontinue ACE inhibitor therapy unless directed by healthcare professional.

Caution patients 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 orthostatic hypotension.

Use of alcohol, standing for long periods, exercising, and hot weather may increase orthostatic hypotension.

Instruct patient to notify healthcare professional of all Rx or OTC medications, vitamins, or herbal products being taken and consult healthcare 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 prior to treatment or surgery.

Advise patient that medication may cause impairment of taste that generally resolves within 8–12 wk, even with continued therapy.

Instruct patient to notify healthcare professional if rash; mouth sores; sore throat; fever; swelling of hands or feet; irregular heartbeat; chest pain; dry cough; heartbeat; swelling of face, arms, lips, or tongue; difficulty swallowing or breathing occurs; or if taste impairment or skin rash persists. Consult healthcare professional if cough becomes bothersome. This may indicate heart failure.

Instruct patient to notify healthcare professional if mouth sores persist.

Instruct patient to notify healthcare professional if rash; mouth sores; sore throat; fever; swelling of hands or feet; irregular heartbeat; chest pain; dry cough; heartbeat; swelling of face, arms, lips, or tongue; difficulty swallowing or breathing occurs; or if taste impairment or skin rash persists. Consult healthcare professional if cough becomes bothersome. This may indicate heart failure.

Advise women of childbearing age to use contraception and notify healthcare professional immediately if pregnancy is planned or suspected.

Emphasize the importance of follow-up examinations to evaluate effectiveness of medication.

Hypertension: Encourage patient to comply with additional interventions for hypertension (weight reduction, low sodium diet, discontinuation of smoking, modification of alcohol consumption, regular exercise, and stress management). Medication controls but does not cure hypertension.

Instruct patient and family on correct technique for monitoring BP. Advise them to check BP at least weekly and to report significant changes to healthcare professional.

Evaluation/Desired Outcomes

- Decrease in BP without appearance of excessive side effects
- Improvement in survival and reduction of symptoms in heart failure
- Reduction of risk of death or development of heart failure following myocardial infarction
- Decrease in progression of diabetic nephropathy

Why was this drug prescribed for your patient?