amlodipine/hydrochlorothiazide/olmesartan medoxomil

**Therapeutic:** antihypertensives

**Pharmacologic:** angiotensin II receptor antagonists, calcium channel blockers, thiazide diuretics

**Pregnancy Category:** C (first trimester), D (second and third trimesters)

**Indications**

Treatment of hypertension, not indicated for initial therapy. May be used for add-on/switch therapy in patients not adequately controlled by two of the following: angiotensin receptor blockers (ARBs), calcium-channel blockers or diuretics.

**Action**

**Amlodipine**—Inhibits the transport of calcium into myocardial and vascular smooth muscle cells, resulting in inhibition of excitation-contraction coupling and subsequent contraction.

**Hydrochlorothiazide**—Increases excretion of sodium and water by inhibiting sodium reabsorption in the distal tubule. Promotes excretion of chloride, potassium, hydrogen, magnesium, phosphate, calcium and bicarbonate. May produce arteriolar dilatation.

**Olmesartan**—Blocks vasoconstrictor and aldosterone-secreting effects of angiotensin II at various receptor sites including vascular smooth muscle and the adrenal glands.

**Therapeutic Effects:** Lowering of BP.

**Pharmacokinetics**

<table>
<thead>
<tr>
<th>Component</th>
<th>Route</th>
<th>Onset</th>
<th>Peak</th>
<th>Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Olmesartan (PO)</td>
<td>1 wk</td>
<td>2 wk</td>
<td>24 hr</td>
<td></td>
</tr>
<tr>
<td>Amlodipine (PO)</td>
<td>unknown</td>
<td>6–9 hr</td>
<td>24 hr</td>
<td></td>
</tr>
<tr>
<td>Hydrochlorothiazide (PO)</td>
<td>3–4 days</td>
<td>7–14 days</td>
<td>24 hr</td>
<td></td>
</tr>
</tbody>
</table>

**Contraindications/Precautions**

**Amlodipine**

Contraindicated in: Hypersensitivity; Systolic BP/90 mm Hg. Use Cautiously in: Severe hepatic impairment (dosage reduction recommended); Aortic stenosis; History of HF; OB, Lactation, Pedi: Safety not established; Geri: Dose reduction recommended; Risk of hypotension.

**Hydrochlorothiazide**

Contraindicated in: Hypersensitivity; Syncope BP/90 mm Hg. Use Cautiously in: Renal or hepatic impairment; OB: Jaundice or thrombocytopenia may be seen in the newborn.

**Olmesartan**

Contraindicated in: Hypersensitivity; Bilateral renal artery stenosis; OB: Can cause injury or death of fetus—If pregnancy occurs, discontinue immediately; Lactation: Discontinue olmesartan or provide formula.

**Protein Binding:** Amlodipine—95–98%; Olmesartan—99%.

**Metabolism and Excretion:** Amlodipine—Mostly metabolized by the liver; Hydrochlorothiazide—Excreted mainly unchanged by the kidneys; Olmesartan—67% excreted unchanged in urine, remainder eliminated in feces and bile.

**Half-life:** Amlodipine—20–50 hr (in patients and patients with hepatic impairment); Hydrochlorothiazide—6–15 hr (Olmesartan) 1 hr.
Use Cautiously In: Volume- or salt-depleted patients or patients receiving high doses of diuretics (correct deficits before initiating therapy or initiate at lower doses); Black patients (may not be as effective); Impaired renal function due to primary renal disease or HF (may worsen renal function); Patients with childbearing potential; Pedi: Children <6 yr (safety not established).

Adverse Reactions/Side Effects

Amlodipine
CNS: headache, dizziness, fatigue.
CV: peripheral edema, angina, bradycardia, hypotension, palpitations.
GI: gingival hyperplasia, nausea.
Derm: flushing.
Hydrochlorothiazide
CNS: dizziness, drowsiness, lethargy, weakness.
CV: hypotension.
GI: anorexia, cramping, hepatitis; nausea, vomiting.
Derm: photosensitivity, rash.
Endo: hyperglycemia, hypokalemia, hyperuricemia, hypercholesterolemia, hyperlipidemia, hyperprolactinemia, hyperuricemia.
Met: blood eosinophilia; Metabolism: hyperuricemia; muscle cramps.
Misc: pancreatitis.
Olmesartan
CNS: hypotension
CV: hypotension, bradycardia.
GI: nausea.
Derm: flushing.
Endo: hyperglycemia; hyperlipidemia; hyperuricemia.
Met: blood eosinophilia.
Misc: anaphylactic reactions.

Interactions

Amlodipine
Drug-Drug: Additive hypotension may occur when used concurrently with fenfluramine, other antihypertensives, nitrates, acute ingestion of alcohol, or quinidine. Additive hypotensive effects may be minimized by concurrent use of nonsteroidal anti-inflammatory agents. May risk of electrolyte depletion with lithium, NSAIDs.

Drug-Food: Grapefruit juice may increase serum levels and effect.

Hydrochlorothiazide
Drug-Drug: Additive hypotension may occur with other antihypertensives. Excessive hypotension may occur with concurrent use of diuretics. Antihypotensive effect may be blunted by NSAIDs. May risk of hyperkalemia with concurrent use of potassium supplements, potassium-containing salt substitutes, angiotensin-converting enzyme inhibitors, or potassium-sparing diuretics.

Route/Dosage
PO (Adults): Initiate at equivalent doses of current single agents; may be increased every two weeks, increasing one component at a time to a maximum of olmesartan 40 mg/amlodipine 10 mg/hydrochlorothiazide 25 mg once daily.

NURSING IMPLICATIONS

Assessment
● Assess BP (sitting, lying, standing) and pulse periodically during therapy.
● Monitor frequency of prescription refills to determine adherence to therapy.
● Assess patient for signs of angioedema (dyspnea, facial swelling). May rarely cause angioedema.
● Lab Test Considerations: Monitor serum electrolytes and glucose periodically during therapy. May cause hypokalemia, hyperlipidemia, hyperuricemia, metabolic acidosis, dilutional hyponatremia, hyperkalemia, hyperuricemia.
● Monitor renal function. May cause BUN and serum creatinine.
● May rarely cause death in homozygous and heterozygous.

Potential Nursing Diagnoses
● Risk for injury (Adverse Reactions)
● Noncompliance (Patient/Family Teaching)

Implementation
● Correct volume depletion, if possible, before initiation of therapy.
● PO: Administer without regard to food.
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Patient/Family Teaching

- Emphasize the importance of continuing to take as directed, even if feeling well. Take missed doses as soon as remembered or as soon as ability to take is regained; do not double doses. Medication controls but does not cure hypertension. Instruct patient to take medication at the same time each day. Younger patients and those with heart failure may be at increased risk of developing hypertension.
- Caution patients to avoid salt substitutes containing potassium or foods containing high levels of potassium or sodium that are directed by health care professional.
- Encourage patient to comply with additional interventions for hypertension (weight reduction, low-sodium diet, smoking cessation, moderation of alcohol consumption, regular exercise, and stress management). Medication controls but does not cure hypertension.
- Instruct patient and family on proper technique for monitoring BP. Advise them to check BP at least weekly and to report significant changes.

- May cause light-headedness, especially during first days of therapy. Advise patient to notify health care professional if light-headedness occurs; if syncope occurs discontinue until health care professional has been consulted. Caution patient to avoid sudden position changes to decrease orthostatic hypotension. Use of alcohol, standing for long periods, exercising, and hot weather may increase orthostatic hypotension.
- May cause dizziness. Caution patient to avoid driving and other activities requiring alertness until response to medication is known.
- Instruct patient to notify health care professional of all Rx or OTC medications, vitamins, or herbal products being taken and to avoid concurrent use of all Rx, OTC, and herbal products, especially NSAIDs and cough, cold, or allergy medications, without consulting health care professional.
- Instruct patient to notify health care professional of medication regimen before treatment or surgery.

- Instruct patient to notify health care professional if swelling of face, eyes, lips, or tongue, if difficulty swallowing or breathing, dry mouth, thirst, weakness, tiredness or sleepiness, restlessness, confusion, seizures, muscle pain or cramps, muscle tiredness, dizziness or fainting, low or no urine output, fast heartbeat, anxiety or vomiting occur.
- Emphasize the importance of follow-up exams to evaluate effectiveness of medication.
- Advise women of childbearing age to use contraception and notify health care professional immediately if pregnancy is planned or suspected, or if breast feeding.

Evaluation/Desired Outcomes

- ↓ in BP without excessive side effects.

Why was this drug prescribed for your patient?