**verapamil**

Calan, Calan SR, Sotepin SR, Verelan, Verelan PM

**Classification**
Therapeutic: antianginals, antiarrhythmics (class IV), antihypertensives, vascular headache suppressants
Pharmacologic: calcium channel blockers

**Pregnancy Category:** C

**Indications**
- Management of hypertension, angina pectoris, and/or vasospastic (Prinzmetal’s) angina.
- Management of supraventricular arrhythmias and rapid ventricular rates in atrial flutter or fibrillation.

**Unlabeled Use:** Prevention of migraine headache.

**Action**
- Inhibits the transport of calcium into myocardial and vascular smooth muscle cells, resulting in inhibition of excitation-contraction coupling and subsequent contraction. Decreases SA and AV conduction and prolongs AV node refractory period in conduction tissue.

**Therapeutic Effects:**
- Systemic vasodilation resulting in decreased BP.
- Coronary vasodilation resulting in decreased frequency and severity of attacks of angina.
- Reduction of ventricular rate during atrial fibrillation or flutter.

**Pharmacokinetics**

**Absorption:** 90% absorbed after oral administration, but much is rapidly metabolized, resulting in bioavailability of 20–25%.

**Distribution:** Small amounts enter breast milk.

**Protein Binding:** 90%.

**Metabolism and Excretion:** Mostly metabolized by the liver (primarily by CYP3A4).

**Half-life:** 4.5–12 hr.

**TIME/ACTION PROFILE (cardiovascular effects)**

<table>
<thead>
<tr>
<th>ROUTE</th>
<th>ONSET</th>
<th>PEAK</th>
<th>DURATION</th>
</tr>
</thead>
<tbody>
<tr>
<td>PO ER</td>
<td>1–2 hr</td>
<td>3–5 hr</td>
<td>2 days</td>
</tr>
<tr>
<td>PO-ER</td>
<td>unknown</td>
<td>5–7 hr</td>
<td>2–4 wk</td>
</tr>
<tr>
<td>IV</td>
<td>1–5 min</td>
<td>3–5 min</td>
<td>2 hr</td>
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</tbody>
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| Single dose effects from multiple doses can not be exceeded for 24–48 hr. |
| Calcium channel blocking effects begin 1–3 min after injection and persist for 18–24 hrs. |

**Contraindications/Precautions**

**Contraindicated in:**
- Hypersensitivity; Sick sinus syndrome; 2nd- or 3rd-degree AV block (unless an artificial pacemaker is in place); Systolic BP <90 mm Hg; HF, severe ventricular dysfunction, or cardiogenic shock, unless associated with supraventricular tachyarrhythmias; Concurrent IV beta blocker therapy.

**Use Cautiously in:**
- Severe hepatic impairment (dose reduction recommended); History of serious ventricular arrhythmias or HF; Geri: Dose reduction/reduced IV infusion rates recommended (risk of hypotension); OB, Lactation: Safety not established.

**Adverse Reactions/Side Effects**

**CNS:**
- neurologic effects include: confusion, hallucinations, depression, confusion, dizziness, lightheadedness, drowsiness, extrapyramidal reactions, headache, paresthesia, psychiatric disturbances.

**EENT:**
- blurred vision, disturbed equilibrium, epistaxis, tinnitus.

**Resp:**
- cough, dyspnea, shortness of breath.

**CV:**
- arrhythmias, hypotension, bradycardia, chest pain, angina, palpitations, peripheral edema, syncope, tachycardia.

**GI:**
- q liver enzymes, anorexia, constipation, diarrhea, dry mouth, dysgeusia, dyspepsia, nausea, vomiting.

**GU:**
- dysuria, nocturia, polyuria, sexual dysfunction.

**Derm:**
- STEVENS-JOHNSON SYNDROME, dermatitis, erythema multiforme, flushing, hyperpigmentation, pruritus/urticaria, rash, sweating, phototoxicity.

**Endo:**
- gynecomastia, hyperglycemia.

**Hemat:**
- anemia, leukopenia, thrombocytopenia.

**Metab:**
- weight gain.

**MS:**
- joint stiffness, muscle cramps.

**Neuro:**
- paresthesia, tremor.

**Misc:**
- gingival hyperplasia.

**Interactions**

**Drug-Drug:**
- Additive hypotension may occur when used concurrently with fentanyl, other antihypertensives, nitrites, acute ingestion of alcohol, or quinidine.
- Antihypertensive effects may be increased by concurrent use of NSAIDs. Serum digoxin levels may be ↓. Concurrent use with beta blockers, digoxin, disopyramide, monitizine, or fenitroline is contraindicated.
- Additive hypotensive actions may occur with other antihypertensives, angiotensin-converting enzyme (ACE) inhibitors, and angiotensin II receptor antagonists. Therefore, when converting from a monoamine oxidase (MAO) inhibitor to verapamil, a 3–4 week washout period is recommended to prevent a lethal hypertensive crisis.

**Overdosage:**
- Life-threatening effects may occur from single or multiple doses that are not justified for usual therapeutic use.

**Route/Dosage**

**Adults**

PO:
- Hypertension: Initially 120 mg PO qd; max 840 mg/day.
- Angina: Initially 60 mg PO tid; max 360 mg/day.
- Supraventricular arrhythmias: Initially 40 mg PO tid; max 240 mg/day.

**Children**

PO:
- Hypertension: Initially 0.5–1 mg/kg/day in divided doses; max 120 mg/day.
- Angina: Initially 0.5 mg/kg/day in divided doses; max 90 mg/kg/day.
- Supraventricular arrhythmias: Initially 0.5 mg/kg/day in divided doses; max 60 mg/kg/day.

**Pediatric Use:**

**Precautions:**

- Use caution in patients with severe hepatic impairment or HF.

**Geriatric Use:**

**Precautions:**

- Use caution in geriatric patients due to the risk of hypotension.

**Pregnancy:**

**Precautions:**

- Use caution during pregnancy due to the risk of fetal harm.

**Lactation:**

**Precautions:**

- Safety not established during lactation.

**Adverse Reactions/Side Effects**

**CNS:**
- abnormal dreams, anxiety, confusion, dizziness, lightheadedness, drowsiness, extrapyramidal reactions, headache, paresthesia, psychiatric disturbances.

**EENT:**
- blurred vision, disturbed equilibrium, epistaxis, tinnitus.

**Resp:**
- cough, dyspnea, shortness of breath.

**CV:**
- arrhythmias, hypotension, bradycardia, chest pain, angina, palpitations, peripheral edema, syncope, tachycardia.

**GI:**
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**Interactions**

**Drug-Drug:**
- Additive hypotension may occur when used concurrently with fentanyl, other antihypertensives, nitrites, acute ingestion of alcohol, or quinidine.
- Antihypertensive effects may be increased by concurrent use of NSAIDs. Seru
Monitor intake and output ratios and daily weight. Assess for signs of HF.

Assess location, duration, intensity, and precipitating factors of patient’s anginal pain.

Potentially interacting agents: Use caution when patients are being treated with other antihypertensive agents, including beta blockers, ACE inhibitors, angiotensin receptor blockers, and diuretics. Use caution when patients are also taking antiarrhythmics (quinidine, procainamide, amiodarone, ibutilide, sotalol), antiarrhythmic agents, and cardiac glycosides. Use caution when patients are also using vasodilators (nitrates, hydralazine, prazosin, doxazosin, or labetalol), or steroids. Use caution when patients are also using beta blockers, nonsteroidal anti-inflammatory agents, aspirin, ACE inhibitors, angiotensin receptor blockers, calcium channel blockers, angiotensin-converting enzyme inhibitors, digoxin, and/or ampicillin.

Assess patient’s mental status and motor activity to determine if the drug is altering these functions. Assess for signs of toxicity with hypertension and tachyarrhythmias. Assess for signs of toxicity with hypotension and bradycardia, such as hypotension, hypotension, tachycardia, QT prolongation, and torsade de pointes. Assess for signs of toxicity with hypotension and bradycardia, such as hypotension, hypotension, tachycardia, QT prolongation, and torsade de pointes. Assess for signs of toxicity with hypotension and bradycardia, such as hypotension, hypotension, tachycardia, QT prolongation, and torsade de pointes.

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amin, cyclophosphamide, cyclosporine, daunorubicin, dexamethasone, dideoxycytidine, dideoxynucleoside, diltiazem, dipyridamole, doxycycline, docetaxel, dolasetron, dopamine, doxorubicin hydrochloride, doxorubicin liposomal, doxycycline, etofylline, epinephrine, erythropoietin, esmolol, estrogens, etoposide, ezetimibe, fluconazole, flus柚rate, flubendazole, flubiprofen, fluoxetine, fludarabine, flunisolide, fluorouracil, folic acid, furosemide, ganciclovir, gentamicin, geldanamycin, glycopyrrolate, granisetron, heparin, hydrocortisone sodium succinate, hydromorphone, idarubicin, ifosfamide, imipenem/cilastatin, insulin, irinotecan, isoproterenol, ketorolac, labetalol, leucovorin calcium, levetiracetam, levetiracetam, lidocaine, linezolid, lorazepam, magnesium sulfate, mannitol, mechlorethamine, methenamine, melphalan, metformin, metoprolol, metronidazole, midazolam, milrinone, mitoxantrone, morphine, moxifloxacin, multivitamins, mycophenolate, nalbuphine, naloxone, nesiritide, nitroglycerin, nitroprusside, norepinephrine, octreotide, ondansetron, oxaliplatin, oxytocin, paclitaxel, palonosetron, pamidronate, pancuronium, papaverine, pemetrexed, penicillin G, pentamidine, pentazocine, phentolamine, phenylephrine, phytonadione, potassium acetate, potassium chloride, procainamide, prochlorperazine, promethazine, propranolol, protamine, pyridoxime, quinupristin/dalfopristin, ranitidine, rocuronium, sodium acetate, streptokinase, succinylcholine, sufentanil, tacrolimus, teniposide, theophylline, thiamine, ticarcillin/clavulanate, tirofiban, tobramycin, tolazoline, vancomycin, vasopressin, vecuronium, vinblastine, vincristine, vinorelbine, voriconazole, zoledronic acid.

● Cautions:
  - May cause drowsiness or dizziness. Advise patient to avoid driving or other activities requiring alertness until response to the medication is known.
  - Caution patient to wear protective clothing and use sunscreen to prevent photosensitivity reactions.
  - Angina: Instruct patient on concurrent nitrate or beta-blocker therapy to continue taking both medications as directed and use SL nitroglycerin as needed for anginal attacks.
  - Hypertension: Encourage patient to comply with other interventions for hypertension (weight reduction, low-sodium diet, smoking cessation, moderation of alcohol consumption, regular exercise, and stress management). Medication control that does not cure hypertension.
  - Instruct patient and family in proper techniques for monitoring BP. Advise patient to take BP weekly and to report significant changes to health care professional.

Y-Site Incompatibility:

  - acyclovir, albumin, aminophylline, ampicillin, amphotericin B cholesteryl, amphotericin B colloidal, amphotericin B liposome, amphotericin B 30%
  - aztreonam, celiprolol, cefoperazone, ceftazidime, chloramphenicol, dantrolene, diazepam, diltiazem, etoposide, famotidine, furosamide, furosemide, furosemide, gabexate, lidocaine, liposomal, lorazepam, morphine, piperacillin/tazobactam, pentobarbital, phenobarbital, phenylephrine, phytonadione, potassium acetate, potassium chloride, procainamide, prochlorperazine, promethazine, propranolol, protamine, pyridoxime, quinupristin/dalfopristin, ranitidine, rocuronium, sodium acetate, streptokinase, succinylcholine, sufentanil, tacrolimus, teniposide, theophylline, thiamine, ticarcillin/clavulanate, tirofiban, tobramycin, tolazoline, vancomycin, vasopressin, vecuronium, vinblastine, vincristine, vinorelbine, voriconazole, zoledronic acid.

Patient/Family Teaching

  - Advise patient to take medication as directed, even if feeling well. Take missed doses as soon as possible; wait almost time for next dose; do not double doses. May need to be discontinued gradually.
  - Advise patient to avoid large amounts (6–8 glasses of grapefruit juice/day) during therapy.
  - Instruct patient on correct technique for monitoring pulse. Instruct patient to contact health care professional if heart rate is < 50 bpm.
  - Caution patient to change positions slowly to minimize orthostatic hypotension.
  - Instruct patient on importance of maintaining good dental hygiene and seeing dentist frequently for teeth cleaning to prevent tenderness, bleeding, and gingival hyperplasia (gum enlargement).
  - Instruct patient to notify health care professional of all Rx or OTC medications, vitamins, or herbal products being taken and consult health care professional before taking any new medications, especially cold preparations.
  - Instruct patient to notify health care professional if irregular heartbeats, rash, dyspnea, swelling of hands and feet, pronounced dizziness, nausea, constipation, or loss of headache occurs or if headache is severe or persistent.
  - Caution patient to wear protective clothing and use sunscreen to prevent photosensitivity reactions.
  - Angina: Instruct patient on concurrent nitrate or beta-blocker therapy to continue taking both medications as directed and use SL nitroglycerin as needed for anginal attacks.
  - Advise patient to contact health care professional if chest pain does not improve, worsens after therapy, or occurs with diaphoresis; if shortness of breath occurs; or if severe, persistent headache occurs.
  - Caution patient to discuss exercise restrictions with health care professional before exertion.
  - Hypertension: Encourage patient to comply with other interventions for hypertension (weight reduction, low-sodium diet, smoking cessation, moderation of alcohol consumption, regular exercise, and stress management). Medication control that does not cure hypertension.
  - Instruct patient and family in proper techniques for monitoring BP. Advise patient to take BP weekly and to report significant changes to health care professional.
Evaluation/Desired Outcomes

- Decrease in BP.
- Decrease in frequency and severity of anginal attacks.
- Decrease in need for nitrate therapy.
- Increase in activity tolerance and sense of well-being.
- Suppression and prevention of atrial tachyarrhythmias.

Why was this drug prescribed for your patient?