**DESCRIPTION**

Propranolol hydrochloride is a synthetic beta-adrenergic receptor-blocking agent chemically described as (α,α)-1-(Isopropylamino)-3-(1-naphthyloxy)-2-propanol hydrochloride. Its structural formula is:

![Chemical structure of propranolol hydrochloride](image)

Propranolol hydrochloride is a stable, white, crystalline solid insoluble in water and ethanol. Its molecular weight is 295.80.

**INDICATIONS**

1. Angina pectoris
2. Hypertension
3. Nonallergic bronchospasm (e.g., Chronic Bronchitis, Emphysema)
4. Migraine
5. Hypertrophic Subaortic Stenosis
6. Sinus bradycardia and greater than first-degree atrioventricular block
7. Chest pain associated with unstable angina pectoris
8. Prevention of angina pectoris
9. Sinus arrhythmia
10. Hypertensive emergencies

**CONTRAINDICATIONS**

1. History of bronchial asthma
2. Severe chronic obstructive lung disease
3. Congestive heart failure (see ADVERSE REACTIONS)
4. Congestive heart failure or recent myocardial infarction
5. Nonallergic bronchospasm (e.g., Chronic Bronchitis, Emphysema)
6. Malignant hypertension

**WARNINGS**

Hypersensitivity reactions, including anaphylactic/anaphylactoid reactions and (or) purpura, have been associated with the administration of propranolol (see ADVERSE REACTIONS).

**PRECAUTIONS**

Propranolol should be used with caution in patients with impaired hepatic or renal function. Propranolol hydrochloride is not indicated for the treatment of hypertensive emergencies.

**ADVERSE REACTIONS**

In patients without a history of heart failure, continued use of beta blockers can, in some cases, lead to cardiac failure. Therefore, the first sign of heart failure is an increase in pedal edema, especially in patients with hypoventilation or poor inspiratory function. In some cases, beta blockers may cause an increased heart rate, which should be closely observed if propranolol hydrochloride is administered. The added catecholamine-blocking action may produce an excessive reduction of resting sympathetic nervous activity which may result in hypotension, marked bradycardia, vertigo, syncope attacks, or orthostatic hypotension.

Caution should be exercised when patients receiving a beta blocker are administered a calcium-channel-blocking drug, especially in the presence of hypotension or decreased myocardial contractility or atrioventricular conduction. On rare occasions, the concomitant intravenous use of a beta blocker and verapamil has resulted in serious adverse reactions, especially in patients with severe cardiomyopathy, congestive heart failure or recent myocardial infarction.

Blunting of the antihypertensive effect of beta-adrenergic blocking agents by nonsteroidal anti-inflammatory drugs has been reported.

Hypotension and cardiac arrest have been reported with the concomitant use of propranolol and haloperidol.

In patients with angina pectoris, there have been reports of the exacerbation of angina and, in some cases, myocardial infarction, following abrupt discontinuance of propranolol hydrochloride therapy. Therefore, when discontinuance of propranolol hydrochloride is planned, the dosage should be reduced over at least a few weeks, and the patient should be cautioned against interruption or cessation of therapy without the prior advice of the physician. If propranolol hydrochloride therapy is interrupted and exacerbation of angina occurs, it usually is advisable to reinstitute propranolol hydrochloride therapy and slowly increase the dose. Overdose of the hydrochloride should be discontinued (gradually, if possible).

In patients with angina pectoris, there has been a report of the exacerbation of angina and, in some cases, myocardial infarction, following abrupt discontinuance of propranolol hydrochloride therapy. Therefore, when discontinuance of propranolol hydrochloride is planned, the dosage should be reduced over at least a few weeks, and the patient should be cautioned against interruption or cessation of therapy without the prior advice of the physician. If propranolol hydrochloride therapy is interrupted and exacerbation of angina occurs, it usually is advisable to reinstitute propranolol hydrochloride therapy and slowly increase the dose. Overdose of the hydrochloride should be discontinued (gradually, if possible).

In patients with angina pectoris, there has been a report of the exacerbation of angina and, in some cases, myocardial infarction, following abrupt discontinuance of propranolol hydrochloride therapy. Therefore, when discontinuance of propranolol hydrochloride is planned, the dosage should be reduced over at least a few weeks, and the patient should be cautioned against interruption or cessation of therapy without the prior advice of the physician. If propranolol hydrochloride therapy is interrupted and exacerbation of angina occurs, it usually is advisable to reinstitute propranolol hydrochloride therapy and slowly increase the dose. Overdose of the hydrochloride should be discontinued (gradually, if possible).

In angina pectoris, propranolol generally reduces the oxygen requirement of the heart at any given level of effort by blocking the catecholamine-induced increases in the heart rate, systolic blood pressure, and myocardial oxygen consumption. Propranolol may increase oxygen requirements by increasing left ventricular fiber length, end diastolic pressure, and (or) sympathetic nervous activity. The beta-adrenergic blockade is usually advantageous and is manifested during exercise by delayed onset of pain and increased work capacity.

In dosages greater than required for beta blockade, propranolol hydrochloride also exerts a quinidine-like or anesthetic-like membrane action which affects the cardiac action potential. The significance of the membrane action in the treatment of arrhythmias is uncertain.

The mechanism of the antiarrhythmic effect of propranolol has not been established. Beta-adrenergic receptors have been demonstrated in the pial vessels of the brain.

Beta-receptor blockade can be useful in conditions in which, because of pathological changes, sympathetic activity is detrimental to the patient. But there are also situations in which sympathetic stimulation is vital. For example, in patients with arteriovenous malformations, sympathetic activity is maintained by virtue of sympathetic drive, which should be preserved. In the presence of AV block, greater than first degree, beta blockade prevents the necessary facilitating effect of sympathetic activity on conduction. Beta blockade results in bronchial constriction by interfering with adrenergic bronchodilator activity and should be preserved in patients subject to bronchospasm.

Propranolol is not significantly dialyzable.

In patients with angina pectoris, propranolol reduces the oxygen requirement of the heart at any given level of effort by blocking the catecholamine-induced increases in the heart rate, systolic blood pressure, and myocardial oxygen consumption. Propranolol may increase oxygen requirements by increasing left ventricular fiber length, end diastolic pressure, and (or) sympathetic nervous activity. The beta-adrenergic blockade is usually advantageous and is manifested during exercise by delayed onset of pain and increased work capacity.
Propranolol was given to rats by gavage or in the diet throughout pregnancy and lactation (throughout pregnancy and lactation) at doses as high as 150 mg/kg/day, there was no evidence of drug-related tumorigenesis. No evidence of teratogenicity was found. However, as with other beta-adrenergic blocking agents, propranolol is contraindicated in pregnant women because of its effects on myocardial contractility, heart rate and blood pressure. Since most adverse effects have been mild and transient and have disappeared within the dosing range, reflecting the greater frequency of the spontaneous events, propranolol may be used as needed without having to discontinue therapy. There are no adequate and well-controlled studies in pregnant women. In general, propranolol is not recommended for use during pregnancy, especially during the last trimester, unless the potential benefit justifies the potential risk to the fetus.

**Pregnancy:** Pregnancy Category C

In a series of reproductive and developmental toxicology studies, propranolol was given to rats by gavage or in the diet throughout pregnancy and lactation. At doses of 150 mg/kg/day, there was no evidence of drug-related teratogenicity. In a study in which both male and female rats were exposed to propranolol in their diets at concentrations of up to 0.05%, from 60 days prior to mating and throughout pregnancy and lactation for two generations, there were no effects on fertility. In dietary administration studies in which mice and rats were treated with propranolol for up to 18 months at doses of up to 150 mg/kg/day, there was no evidence of drug-related tumorigenesis. In a study in which both male and female rats were exposed to propranolol in their diets at concentrations of up to 0.05%, from 60 days prior to mating and throughout pregnancy and lactation for two generations, there were no effects on fertility. Based on differing results from Ames Tests performed by different laboratories, there is equivocal evidence for a genotoxic effect of propranolol in bacteria (S. typhimurium strain TA 1538).

**Nursing Mothers**

Propranolol hydrochloride is excreted in human milk. Caution should be exercised when propranolol hydrochloride is administered to a nursing woman.

**Pediatric Use**

Safety and effectiveness in pediatric patients have not been established.

**Geriatric Use**

Clinical studies of propranolol did not include sufficient numbers of subjects aged 65 and over to determine whether they respond differently from younger subjects. Other reported clinical experience has not identified differences in responses between the elderly and younger patients. In general, dose selection for an elderly patient should be cautious, usually starting at the low end of the usual effective dose range, reflecting the greater frequency of decreased hepatic, renal or cardiac function, and of concomitant disease or other drug therapy.

**ADVERSE REACTIONS**

Most adverse effects have been mild and transient and have rarely required the discontinuation of therapy.

**Cardiovascular:** Bradycardia; congestive heart failure; intensification of AV block; hypotension; paresthesia of hands; thrombocytopenic purpura; arterial insufficiency, usually of the Raynaud type.

**Central Nervous System:** Light-headedness; mental depression manifested by insomnia, lassitude, weakness, fatigue; reversible mental depression progressing to catatonia; visual disturbances; hallucinations; vivid dreams; an acute reversible syndrome characterized by disorientation for time and place, short-term memory loss, emotional lability, slightly clouded sensorium, and decreased performance on neuropsychometric tests. For immediate formulations, fatigue, lethargy, and vivid dreams appear dose related.

**Gastrointestinal:** Nausea, vomiting, epigastric distress, abdominal cramping, diarrhea, constipation, mesenteric arterial thrombosis, and ischemic colitis.

**OVERDOSAGE**

Propranolol hydrochloride is not significantly dialyzable. In the event of overdose or exaggerated response, the following measures should be employed:

**General**

If ingestion is, or may have been, recent, evacuate gastric contents, taking care to prevent pulmonary aspiration.

**Bradycardia**

ADMINISTER ATROPINE (0.25 TO 1.0 mg); IF THERE IS NO RESPONSE TO VAGAL BLOCKADE, ADMINISTER ISOPROTERENOL CAUTIously.

**Hypotension**

VASCOPRESSORS, e.g., NOREPINEPHRINE OR EPINEPHRINE (THERE IS EVIDENCE THAT EPINEPHRINE IS THE DRUG OF CHOICE).

**Bronchospasm**

ADMINISTER ISOPROTERENOL AND AMINOPHYLLINE.

**DOSEAGE AND ADMINISTRATION**

Propranolol hydrochloride extended release provides propranolol hydrochloride in a sustained-release capsule for administration once daily. If patients are switched from propranolol hydrochloride tablets to propranolol hydrochloride extended-release capsules, care should be taken to assure that the desired therapeutic effect is maintained. Propranolol hydrochloride extended release has different kinetics and produces lower blood levels. Reattrition may be necessary, especially to maintain effectiveness at the end of the 24-hour dosage interval.

**Hypertension**

Dosage must be individualized. The usual initial dosage is 80 mg propranolol hydrochloride extended release once daily, whether used alone or added to a diuretic. The dosage may be increased to 120 mg once daily or higher until adequate blood pressure control is achieved. The usual maintenance dosage is 120 to 160 mg once daily. In some instances a dosage of 640 mg may be required. The time needed for full hypertensive response to a given dosage is variable and may range from a few days to several weeks.

**Angina Pectoris**

Dosage must be individualized. Starting with 80 mg propranolol hydrochloride extended release once daily, dosage should be gradually increased at three-to seven-day intervals until optimal response is obtained. Although individual patients may respond at any dosage level, the average optimal dosage appears to be 160 mg once daily. In angina pectoris, the value and safety of dosage exceeding 320 mg per day have not been established.

**HOW SUPPLIED**

The 60 mg capsules are aqua blue printed “par 282” in gray ink and the cap is white opaque printed “par 282” in blue ink.

NDC 49984-282-01 Bottle of 100
NDC 49984-282-10 Bottle of 1000

The 80 mg capsules are aqua blue opaque printed “par 328” in gray ink and the cap is aqua blue opaque printed “par 328” in gray ink.

NDC 49984-328-01 Bottle of 100
NDC 49984-328-10 Bottle of 1000

The 120 mg capsules are aqua blue opaque printed “par 323” in gray ink and the cap is dark blue opaque printed “par 323” in gray ink.

NDC 49984-328-01 Bottle of 100
NDC 49984-328-10 Bottle of 1000

The 160 mg capsules are dark blue opaque printed “par 330” in white ink and the cap is dark blue opaque printed “par 330” in white ink.

NDC 49984-330-01 Bottle of 100
NDC 49984-330-10 Bottle of 1000

Store at 20° to 25°C (68° to 77°F); excursions permitted to 15° to 30°C (59° to 86°F). [See USP Controlled Room Temperature]

Protect from light, moisture, freezing, and excessive heat.

Dispense in a light, light-resistant container as defined in the USP.