CARDINOL LA
Propranolol hydrochloride, modified release capsule, 160 mg

Presentation

CARDINOL LA capsules contain spheroids of the beta-blocker propranolol hydrochloride which have a sustained release coating to provide long action.

CARDINOL LA capsules each contain 160 mg propranolol hydrochloride BP. CARDINOL LA is presented as size 1 gelatin capsules with a clear colourless body and opaque, green cap containing cream and white pellets.

Uses

Actions

Propranolol is a competitive antagonist at both the beta₁ and beta₂-adrenoceptors. It has no agonist activity at the beta-adrenoceptor, but has membrane stabilising activity at concentrations exceeding 1 to 3 mg/litre, though such concentrations are rarely achieved during oral therapy. Competitive beta blockade has been demonstrated in man by a parallel shift to the right in the dose-heart rate response curve to beta-agonists such as isoprenaline.

Propranolol, as with other beta-blockers, has negative inotropic effects, and is therefore contraindicated in uncontrolled heart failure.

Propranolol is a racemic mixture and the active form is the S (-) isomer. With the exception of inhibition of the conversion of thyroxine to triiodothyronine it is unlikely that any additional ancillary properties possessed by R (+) propranolol, in comparison with the racemic mixture will give rise to different therapeutic effects.

Propranolol is effective and well-tolerated in most ethnic populations, although the response may be less in black patients.

The sustained release preparation of propranolol maintains a higher degree of beta₁-blockade 24 hours after dosing compared with conventional propranolol.

Pharmacokinetics

Propranolol is completely absorbed after oral administration and peak plasma concentrations occur 1 to 2 hours after dosing in fasting patients. Following oral dosing with the sustained release preparation of propranolol the blood profile is flatter than after conventional propranolol but the half-life is increased to between 10 and 20 hours. The liver removes up to 90% of an oral dose with an elimination half-life of 3 to 6 hours. Propranolol is widely and rapidly distributed throughout the body with highest levels occurring in the lungs, liver, kidney, brain and heart. Propranolol is highly protein bound (80 to 95%).

Indications

CARDINOL LA indicated for the following:

1. Control of hypertension.

3. Long term prophylaxis after recovery from acute myocardial infarction.

---

**Dosage and Administration**

**Adults**

**Hypertension**

The starting dose is one capsule daily, taken either morning or evening. An adequate response is seen in most patients at this dosage. If necessary, it can be increased to two capsules and a further reduction in blood pressure can be attained if a diuretic or other antihypertensive agent is given in addition to CARDINOL LA.

**Angina**

An adequate response is usually obtained with one capsule daily either morning or evening, dependant on patient convenience.

**Post Myocardial Infarction**

Treatment should start between days 5 and 21 after myocardial infarction with one 40 mg propranolol tablet four times a day for 2 or 3 days.

In order to achieve maximum compliance the total daily dosage of 160 mg propranolol may thereafter be given as a single CARDINOL LA capsule. Compliance is extremely important as beta-blockade may have to be continued indefinitely.

**Elderly**

Evidence concerning the relation between blood level and age is conflicting. With regard to the elderly, the optimum dose should be individually determined according to clinical response.

**Children**

CARDINOL LA is not recommended for use in children.

---

**Contraindications**

Hypersensitivity to the active substance or to any of the excipients.

CARDINOL LA must not be used if there is a history of bronchial asthma or bronchospasm

Bronchospasm can usually be reversed by beta₂ agonist bronchodilators such as salbutamol. Large doses of the beta₂ agonist bronchodilator may be required to overcome the beta blockade produced by propranolol and the dose should be titrated according to the clinical response; both intravenous and inhalational administration should be considered. The use of intravenous aminophylline and/or the use of ipratropium (given by nebuliser) may also be considered. Glucagon (1 to 2 mg given intravenously) has also been reported to produce a bronchodilator effect in asthmatic patients. Oxygen or artificial ventilation may be required in severe cases.

CARDINOL LA as with other beta-blockers must not be used in patients with any of the following conditions: known hypersensitivity to the substance; bradycardia; cardiogenic shock; hypotension; metabolic acidosis; after prolonged fasting; severe peripheral arterial circulatory disturbances; second or third degree heart block; sick sinus syndrome; untreated phaeochromocytoma; uncontrolled heart failure; Prinzmetal's angina.

CARDINOL LA must not be used in patients prone to hypoglycaemia, i.e., patients after prolonged fasting or patients with restricted counter-regulatory reserves. Patients with restricted counter
regulatory reserves may have reduced autonomic and hormonal responses to hypoglycaemia which includes glycogenolysis, gluconeogenesis and/or impaired modulation of insulin secretion. Patients at risk for an inadequate response to hypoglycaemia includes individuals with malnutrition, prolonged fasting, starvation, chronic liver disease, diabetes and concomitant use of drugs which block the full response to catecholamines.

Warnings and Precautions

Propranolol as with other beta-blockers:

- although contraindicated in uncontrolled heart failure, may be used in patients whose signs of heart failure have been controlled. Caution must be exercised in patients whose cardiac reserve is poor.

- should not be used in combination with calcium channel blockers with negative inotropic effects (e.g. verapamil, diltiazem), as it can lead to an exaggeration of these effects particularly in patients with impaired ventricular function and/or SA or AV conduction abnormalities. This may result in severe hypotension, bradycardia and cardiac failure. Neither the beta-blocker nor the calcium channel blocker should be administered intravenously within 48 hours of discontinuing the other.

- should not be used in patients with Prinzmetal’s angina and beta_1 selective agents should be used with care.

- although contraindicated in severe peripheral arterial circulatory disturbances, may also aggravate less severe peripheral arterial circulatory disturbances.

- due to its negative effect on conduction time, caution must be exercised if propranolol is given to patients with first degree heart block.

- may block/modify the signs and symptoms of hypoglycaemia (especially tachycardia). Propranolol occasionally causes hypoglycaemia, even in non-diabetic patients, e.g., neonates, infants, children, elderly patients, patients on haemodialysis or patients suffering from chronic liver disease and patients suffering from overdose. Severe hypoglycaemia associated with propranolol long-acting has rarely presented with seizures and/or coma in isolated patients. Caution must be exercised in the concurrent use of propranolol and hypoglycaemic therapy in diabetic patients. Propranolol may prolong the hypoglycaemic response to insulin.

- may mask the signs of thyrotoxicosis.

- should not be used in untreated phaeochromocytoma. However, in patients with phaeochromocytoma, an alpha-blocker may be given concomitantly.

- will reduce heart rate as a result of its pharmacological action. In the rare instances when a treated patient develops symptoms that may be attributable to a slow heart rate, the dose may be reduced.

- may cause a more severe reaction to a variety of allergens when given to patients with a history of anaphylactic reaction to such allergens. Such patients may be unresponsive to the usual doses of adrenaline used to treat the allergic reactions.

Abrupt withdrawal of beta-blockers is to be avoided. The dosage should be withdrawn gradually over a period of 7 to 14 days. An equivalent dosage of another beta-blocker may be substituted during the withdrawal period to facilitate a reduction in dosage below CARDINOL LA 160 mg. Patients should be followed during withdrawal especially those with ischaemic heart disease.
When a patient is scheduled for surgery and a decision is made to discontinue beta-blocker therapy, this should be done at least 24 hours prior to the procedure. The risk/benefit of stopping beta blockade should be made for each patient.

Since the half-life may be increased in patients with significant hepatic or renal impairment, caution must be exercised when starting treatment and selecting the initial dose.

Propranolol must be used with caution in patients with decompensated cirrhosis.

In patients with portal hypertension, liver function may deteriorate and hepatic encephalopathy may develop. There have been reports suggesting that treatment with propranolol may increase the risk of developing hepatic encephalopathy.

**Interference with laboratory tests:** Propranolol has been reported to interfere with the estimation of serum bilirubin by the diazo method and with the determination of catecholamines by methods using fluorescence.

**Pregnancy**

As with all other medicines, propranolol should not be given in pregnancy unless its use is essential. There is no evidence of teratogenicity with propranolol. However, beta-blockers reduce placental perfusion, which may result in intra-uterine foetal death, immature and premature deliveries. In addition, adverse effects (especially hypoglycaemia and bradycardia in the neonate and bradycardia in the foetus) may occur. There is an increased risk of cardiac and pulmonary complications in the neonate in the post-natal period.

**Lactation**

Most beta-blockers, particularly lipophilic compounds, will pass into breast milk although to a variable extent. Breast feeding is therefore not recommended following administration of these compounds.

**Effects on ability to drive and use machines**

The use of propranolol is unlikely to result in any impairment of the ability of patients to drive or operate machinery. However it should be taken into account that occasionally dizziness or fatigue may occur.

**Adverse Effects**

Propranolol is usually well tolerated. In clinical studies, the undesired events reported are usually attributable to the pharmacological actions of propranolol.

The following undesired events, listed by body system, have been reported. The following definitions of frequencies are used:

Very common (≥1/10), common (≥1/100 to <1/10), uncommon (≥1/1,000 to <1/100), rare (≥1/10,000 to <1/1,000), very rare (<1/10,000), not known (cannot be estimated from the available data).

<table>
<thead>
<tr>
<th>System Organ class</th>
<th>Frequency</th>
<th>Undesirable Effect</th>
</tr>
</thead>
<tbody>
<tr>
<td>Blood and lymphatic system disorders</td>
<td>Rare</td>
<td>Thrombocytopenia</td>
</tr>
<tr>
<td>Disorder Category</td>
<td>Frequency</td>
<td>Symptoms</td>
</tr>
<tr>
<td>-------------------</td>
<td>-----------</td>
<td>----------</td>
</tr>
<tr>
<td>Endocrine disorders</td>
<td>Not known</td>
<td>Hypoglycaemia in neonates, infants, children, elderly patients, patients on haemodialysis, patients on concomitant antidiabetic therapy, patients with prolonged fasting and patients with chronic liver disease has been reported, seizure linked to hypoglycaemia</td>
</tr>
<tr>
<td>Nervous system disorders</td>
<td>Common</td>
<td>Sleep disturbances, nightmares</td>
</tr>
<tr>
<td></td>
<td>Rare</td>
<td>Hallucinations, psychoses, mood changes, confusion, memory loss, paraesthesia</td>
</tr>
<tr>
<td></td>
<td>Very rare</td>
<td>Isolated reports of myasthenia gravis like syndrome or exacerbation of myasthenia gravis have been reported</td>
</tr>
<tr>
<td>Eye disorders</td>
<td>Rare</td>
<td>Dry eyes, visual disturbances</td>
</tr>
<tr>
<td>Cardiovascular disorders</td>
<td>Common</td>
<td>Bradycardia, cold extremities, Raynaud’s phenomenon</td>
</tr>
<tr>
<td></td>
<td>Rare</td>
<td>Heart failure, deterioration, precipitation of heart block, postural hypotension, which may be associated with syncope, exacerbation of intermittent claudication</td>
</tr>
<tr>
<td>Respiratory, thoracic and mediastinal disorders</td>
<td>Rare</td>
<td>Bronchospasm may occur in patients with bronchial asthma or a history of asthmatic complaints, sometimes with fatal outcome</td>
</tr>
<tr>
<td>Gastrointestinal disorders</td>
<td>Uncommon</td>
<td>Gastrointestinal disturbances, such as nausea, vomiting, diarrhoea</td>
</tr>
<tr>
<td>Skin and subcutaneous tissue disorders</td>
<td>Rare</td>
<td>Purpura, alopecia, psoriasiform skin reactions, exacerbation of psoriasis, skin rashes</td>
</tr>
<tr>
<td>General disorders and administration site conditions</td>
<td>Common</td>
<td>Fatigue and/or lassitude (often transient)</td>
</tr>
<tr>
<td></td>
<td>Rare</td>
<td>Dizziness</td>
</tr>
<tr>
<td>Investigations</td>
<td>Very rare</td>
<td>An increase in ANA (Antinuclear Antibodies) has been observed, however, the clinical relevance of this is not clear</td>
</tr>
</tbody>
</table>

Discontinuance of the medicine should be considered if, according to clinical judgement, the well-being of the patient is adversely affected by any of the above reactions. Cessation of therapy with a beta-blocker should be gradual. In the rare event of intolerance, manifested as bradycardia and
hypotension, the medicine should be withdrawn and, if necessary, treatment for overdosage instituted.

### Interactions

Propranolol modifies the tachycardia of hypoglycaemia. Caution must be exercised in the concurrent use of propranolol-long acting and hypoglycaemic therapy in diabetic patients. Propranolol may prolong the hypoglycaemic response to insulin.

Simultaneous administration of rizatriptan and propranolol can cause an increased rizatriptan AUC and $C_{\text{max}}$ by approximately 70 - 80%. The increased rizatriptan exposure is presumed to be caused by inhibition of first-passage metabolism of rizatriptan through inhibition of monoamine oxidase-A. If both drugs are to be used, a rizatriptan dose of 5 mg has been recommended.

Class I anti-arrhythmic drugs (e.g. disopyramide) and amiodarone may have potentiating effect on atrial-conduction time and induce negative inotropic effect.

Digitalis glycosides in association with beta blockers may increase atrioventricular conduction time.

Combined use of beta-blockers and calcium channel blockers with negative inotropic effects (e.g. verapamil, diltiazem) can lead to an exaggeration of these effects particularly in patients with impaired ventricular function and/or sino-atrial or atrio-ventricular conduction abnormalities. This may result in severe hypotension, bradycardia and cardiac failure. Neither the beta-blocker nor the calcium channel blocker should be administered intravenously within 48 hours of discontinuing the other.

Concomitant therapy with dihydropyridine calcium channel blockers e.g. nifedipine, may increase the risk of hypotension, and cardiac failure may occur in patients with latent cardiac insufficiency.

Concomitant use of sympathomimetic agents e.g. adrenaline, may counteract the effect of beta-blockers. Caution must be exercised in the parenteral administration of preparations containing adrenaline to patients taking beta-blockers as, in rare cases, vasoconstriction, hypertension and bradycardia may result.

Administration of propranolol during infusion of lignocaine may increase the plasma concentration of lignocaine by about 30%. Patients already receiving propranolol tend to have higher lignocaine levels than controls. The combination should be avoided.

Concomitant use of cimetidine or hydralazine will increase plasma levels of propranolol, and concomitant use of alcohol may increase the plasma levels of propranolol.

Beta-blockers may exacerbate the rebound hypertension which can follow the withdrawal of clonidine. If the two medicines are co-administered, the beta-blocker should be withdrawn several days before discontinuing clonidine. If replacing clonidine by beta-blocker therapy, the introduction of beta-blockers should be delayed for several days after clonidine administration has stopped.

Caution must be exercised if ergotamine, dihydroergotamine or related compounds are given in combination with propranolol since vasospastic reactions have been reported in a few patients.

Concomitant use of prostaglandin synthetase inhibiting medicines e.g. ibuprofen and indometacin, may decrease the hypotensive effects of propranolol.

Concomitant administration of propranolol and chlorpromazine may result in an increase in plasma levels of both medicines. This may lead to an enhanced antipsychotic effect for chlorpromazine and an increased antihypertensive effect for propranolol.

Caution must be exercised when using anaesthetic agents with propranolol. The anaesthetist should be informed and the choice of anaesthetic should be an agent with as little negative
inotropic activity as possible. Use of beta-blockers with anaesthetic drugs may result in attenuation of the reflex tachycardia and increase the risk of hypotension. Anaesthetic agents causing myocardial depression are best avoided.

Pharmacokinetic studies have shown that the following agents may interact with propranolol due to effects on the enzyme systems in the liver which metabolise propranolol and these agents: quinidine, propafenone, rifampicin, theophylline, warfarin, thioridazine, and dihydropyridine calcium channel blockers such as nifedipine, nisoldipine, nicardipine, isradipine and lacidipine. Owing to the fact that blood concentrations of either agent may be affected, dosage adjustments may be needed according to clinical judgement (see also the interaction above concerning concomitant therapy with dihydropyridine calcium channel blockers).

Overdosage

The symptoms of overdosage may include bradycardia, hypotension, acute cardiac insufficiency and bronchospasm.

General treatment should include: close supervision, treatment in an intensive care ward, the use of gastric lavage, activated charcoal and a laxative to prevent absorption of any medicine still present in the gastrointestinal tract, the use of plasma or plasma substitutes to treat hypotension and shock.

Excessive bradycardia can be countered with atropine 1 to 2 mg intravenously and/or a cardiac pacemaker. If necessary, this may be followed by a bolus dose of glucagon 10 mg intravenously. If required, this may be repeated or followed by an intravenous infusion of glucagon 1 to 10 mg/hour depending on response. If no response to glucagon occurs or if glucagon is unavailable, a beta-adrenoceptor stimulant such as dobutamine 2.5 to 10 micrograms/kg/minute by intravenous infusion may be given.

Dobutamine, because of its positive inotropic effect could also be used to treat hypotension and acute cardiac insufficiency. It is likely that these doses would be inadequate to reverse the cardiac effects of beta blockade if a large overdose has been taken. The dose of dobutamine should therefore be increased if necessary to achieve the required response according to the clinical condition of the patient.

For further advice on management of overdose please contact the National Poisons Centre on 0800 POISON (0800 764 766).

Pharmaceutical Precautions

Blister pack: store below 30°C.

Bottle pack: store below 25°C.

Medicine Classification

Prescription Medicine.

Package Quantities

Blister pack of 30 capsules.

Bottle pack of 100 capsules. Not all pack types may be marketed.
Further Information

Excipients: Sucrose, maize starch, talc, and shellac

This product is gluten and lactose free.

Sponsor Details

Mylan New Zealand Limited
PO Box 11-183
Ellerslie
AUCKLAND
Telephone 09-579-2792

Date of Preparation

10 August 2016