PRODUCT INFORMATION

Codral* Original Cold & Flu + Cough Day & Night Capsules

Product description

Codral* Original Cold & Flu + Cough Day & Night capsules contain two separate formulations: day capsules and night capsules.

Each Codral* Original Cold & Flu + Cough **day** capsule contains paracetamol 500 mg, pseudoephedrine hydrochloride 30 mg, dextromethorphan hydrobromide 10 mg and the excipients: allura red AC, brilliant blue FCF, gelatin, lactose, magnesium stearate, quinoline yellow, colloidal anhydrous silica, silicon dioxide, sodium lauryl sulfate, purified talc, titanium dioxide, Opacode Black A-10259.

Each Codral* Original Cold & Flu + Cough **night** capsule contains paracetamol 500 mg, chlorpheniramine maleate 2 mg, dextromethorphan hydrobromide 10 mg and the excipients: allura red AC, brilliant blue FCF, gelatin, lactose, magnesium stearate, colloidal anhydrous silica, silicon dioxide, sodium lauryl sulfate, purified talc, titanium dioxide, Opacode Black A-10259.

Pharmacology

Pharmacokinetics

Paracetamol is readily absorbed from the gastrointestinal tract with peak plasma concentrations occurring about 10 to 60 minutes after oral administration. Paracetamol is distributed into most body tissues. Plasma protein binding is negligible at usual therapeutic doses but increases with increasing doses. The elimination half-life varies from about 1 to 3 hours.

Paracetamol is metabolised extensively in the liver and excreted in the urine mainly as inactive glucuronide and sulfate conjugates. Less than 5% is excreted unchanged. The metabolites of paracetamol include a minor hydroxylated intermediate which has hepatotoxic activity. This intermediate metabolite is detoxified by conjugation with glutathione; however, it can accumulate following paracetamol overdosage (more than 150 mg/kg or 10 g total paracetamol ingested) and if left untreated can cause irreversible liver damage.

Paracetamol is metabolised differently by premature infants, newborns, infants and young children compared to adults, the sulfate conjugate being predominant.

Pseudoephedrine is readily absorbed from the gastrointestinal tract. It is largely excreted unchanged in the urine together with small amounts of its hepatic metabolite. It has a half-life of about 5-8 hours; elimination is enhanced and half-life reduced accordingly in acid urine. Small amounts are distributed into breast milk.
Dextromethorphan is well absorbed from the gastrointestinal tract after oral administration. It is metabolised in the liver, exhibiting polymorphic metabolism involving the cytochrome P450 isoenzyme (CYP 2D6). It is excreted in the urine as unchanged dextromethorphan and demethylated metabolites, including dextrorphan, which has some cough suppressant activity. The plasma elimination half-life of dextromethorphan is 1.2 to 3.9 hours. However, the rate of metabolism varies between individuals according to phenotype (extensive v poor metabolisers), with half-life being as long as 45 hours in patients who are poor metabolisers.

Chlorpheniramine maleate is absorbed relatively slowly from the gastrointestinal tract, with peak plasma concentrations occurring about 2.5 to 6 hours after oral administration. Chlorpheniramine appears to undergo considerable first-pass metabolism. Bioavailability is low, values of 25 to 50% having been reported. About 70% of chlorpheniramine in the circulation is bound to plasma proteins. There is wide inter-individual variation in the pharmacokinetics of chlorpheniramine; half-life values ranging from 2 to 43 hours have been reported. Chlorpheniramine is widely distributed in the body and enters the central nervous system (CNS).

Chlorpheniramine is metabolised extensively. Metabolites include desmethyl- and didesmethylchlorpheniramine. Unchanged drug and metabolites are excreted primarily in the urine; excretion is dependent on urinary pH and flow rate. Only trace amounts have been found in the faeces.

A duration of action of 4 to 6 hours has been reported; this is shorter than may be predicted from pharmacokinetic parameters.

More rapid and extensive absorption, faster clearance, and a shorter half-life have been reported in children compared to adults.

**Pharmacodynamics/Mechanism of action**

Paracetamol is a p-aminophenol derivative that exhibits analgesic and antipyretic activity. It does not possess anti-inflammatory activity. Paracetamol is thought to produce analgesia through a central inhibition of prostaglandin synthesis.

Pseudoephedrine has direct and indirect sympathomimetic activity and is an effective decongestant in the upper respiratory tract. It is a stereoisomer of ephedrine and has a similar action, but has been found to have less pressor activity and fewer CNS effects.

Sympathomimetic agents are used as nasal decongestants to provide symptomatic relief. They act by causing vasoconstriction resulting in redistribution of local blood flow to reduce oedema of the nasal mucosa, thus improving ventilation, drainage and nasal stuffiness.

Dextromethorphan is a non-opioid cough suppressant. It is the methylated dextrorotatory analogue of levorphanol, a codeine analogue. Dextromethorphan acts centrally on the cough centre in the medulla and nucleus tractus solaris to increase the cough threshold. It does not have classical analgesic, sedative or respiratory depressant effects at usual antitussive doses.
Chlorpheniramine competes with histamine at central and peripheral histamine\textsubscript{1}-receptor sites, preventing the histamine-receptor interaction and subsequent mediator release.

Chlorpheniramine is a highly lipophilic molecule that readily crosses the blood-brain barrier.

Chlorpheniramine is highly selective for histamine\textsubscript{1}-receptors but has little effect on histamine\textsubscript{2} or histamine\textsubscript{3} receptors. Chlorpheniramine also activate 5-hydroxytryptamine (serotonin) and \(\alpha\)-adrenergic receptors and blocks cholinergic receptors.

**Indications**

Codral* Original Cold & Flu + Cough Day & Night capsules provide temporary relief of cold and flu symptoms. The day capsules temporarily relieve headache, body aches and pains, blocked nose, fever and dry irritated coughs without causing drowsiness. The night capsules temporarily relieve headache, body aches and pains, blocked nose, fever and dry irritated coughs and a runny nose.

**Contraindications**

Paracetamol is contraindicated for use in patients with known hypersensitivity or idiosyncratic reaction to paracetamol (or any of the other ingredients in the product).

Pseudoephedrine is contraindicated for use in patients:
- with known hypersensitivity or idiosyncratic reaction to pseudoephedrine (or any of the other ingredients in the product)
- with severe hypertension or coronary artery disease
- taking monoamine oxidase inhibitors (MAOIs) or who have taken MAOIs within the previous 14 days.

Dextromethorphan is contraindicated for use in patients with known hypersensitivity or idiosyncratic reaction to dextromethorphan (or any of the other ingredients in the product).

Chlorpheniramine is contraindicated for use in patients with:
- a history of hypersensitivity to the substance or substances of similar chemical structure (or any of the other ingredients in the product)
- narrow-angle glaucoma
- stenosing peptic ulcer
- symptomatic prostatic hypertrophy
- bladder neck obstruction
- pyloroduodenal obstruction.

Chlorpheniramine is contraindicated for use in:
- newborns or premature infants
• lactating women
• patients taking monoamine oxidase inhibitors (MAOIs).

Refer to ‘Interactions with other drugs’ for additional information.

Precautions

Paracetamol should be used with caution in patients with:
• impaired hepatic function
• impaired renal function.

Pseudoephedrine should be used with caution in patients with:
• hypertension
• hyperthyroidism
• diabetes mellitus
• coronary heart disease
• ischaemic heart disease
• glaucoma
• prostatic hypertrophy
• severe hepatic or renal dysfunction.

Dextromethorphan should not be used for chronic persistent cough accompanying a disease state, or for cough associated with excessive secretions.

Dextromethorphan should not be given to patients with or at risk of developing respiratory failure, e.g. asthma, chronic obstructive airways disease, and pneumonia. Caution is needed in patients with a history of asthma and it should not be given during an acute attack.

Chlorpheniramine may cause drowsiness and may increase the effects of alcohol. Drowsiness may continue the following day. Those affected should not drive or operate machinery; alcohol should be avoided.

Use with caution in patients with renal or hepatic impairment and in patients with epilepsy.

Refer to ‘Interactions with other drugs’ for additional information.

Use in pregnancy: Category B2

Paracetamol has been taken by a large number of pregnant women and women of childbearing age without any proven increase in the frequency of malformations or other direct or indirect harmful effects on the foetus having been observed.

Pseudoephedrine has been taken by only a limited number of pregnant women and women of childbearing age, without an increase in the frequency of malformation or other direct or indirect harmful effects on the human foetus having been observed. Studies in animals are inadequate or may be lacking, but available data shows no evidence of an increased occurrence of foetal damage.
Pseudoephedrine should be used in pregnancy only if the potential benefits to the patient are weighed against the possible risk to the foetus.

Dextromethorphan has been taken by a large number of pregnant women and women of childbearing age without any proven increase in the frequency of malformations or other direct or indirect harmful effects on the foetus having been observed.

Chlorpheniramine has been taken by a large number of pregnant women and women of childbearing age without any proven increase in the frequency of malformations or other direct or indirect harmful effects on the foetus having been observed.

**Use in lactation**

Paracetamol is excreted in small amounts (< 0.2%) in breast milk. Maternal ingestion of paracetamol in usual analgesic doses does not appear to present a risk to the breastfed infant.

Pseudoephedrine is secreted in breast milk in small amounts. It has been estimated that 0.5% to 0.7% of a single dose of pseudoephedrine ingested by the mother will be excreted in the breast milk over 24 hours. Therefore it is not recommended for breastfeeding mothers unless the potential benefits to the patient are weighed against the possible risk to the infant.

It is not known whether dextromethorphan is excreted in breast milk or whether it has a harmful effect on the breastfeeding infant. Therefore it is not recommended for breastfeeding mothers unless the potential benefits to the patient are weighed against the possible risk to the infant.

Chlorpheniramine is excreted in breast milk. Therefore it is not recommended for breastfeeding mothers unless the potential benefits to the patient are weighed against the possible risk to the infant.

**Use in children and the elderly**

Children and the elderly may experience paradoxical excitation with chlorpheniramine. The elderly are more likely to have CNS depressive side effects, including confusion.

**Interactions with other drugs**

The following interactions with the paracetamol have been noted:

- Anticoagulant drugs (warfarin) – dosage may require reduction if paracetamol and anticoagulants are taken for a prolonged period of time
- Paracetamol absorption is increased by substances that increase gastric emptying, e.g. metoclopramide
- Paracetamol absorption is decreased by substances that decrease gastric emptying, e.g. propantheline, antidepressants with anticholinergic properties, and narcotic analgesics
- Paracetamol may increase chloramphenicol concentrations
The risk of paracetamol toxicity may be increased in patients receiving other potentially hepatotoxic drugs or drugs that induce liver microsomal enzymes such as alcohol and anticonvulsant agents.

Paracetamol excretion may be affected and plasma concentrations altered when given with probenecid.

Colestyramine reduces the absorption of paracetamol if given within 1 hour of paracetamol.

The following interactions with the paracetamol have been noted:

- antidepressant medication eg tricyclic antidepressants and monoamine oxidase inhibitors (MAOIs) – may cause a serious increase in blood pressure or hypertensive crisis.
- other sympathomimetic agents, such as decongestants, appetite suppressants and amphetamine-like psychostimulants – may cause an increase in blood pressure and additive effects.
- methyl dopa and β-blockers – may cause an increase in blood pressure.
- urinary acidifiers enhance elimination of pseudoephedrine.
- urinary alkalinisers decrease elimination of pseudoephedrine.

The following interactions with dextromethorphan have been noted:

Dextromethorphan should not be used in patients taking monoamine oxidase inhibitors (MAOIs) or who have taken MAOIs within the previous 14 days. The use of dextromethorphan with, or within two weeks of taking MAOIs, may increase the risk of serious side effects such as hypertensive crisis, hyperpyrexia and convulsions.

Dextromethorphan when used with SSRI’s (such as fluoxetine) or tricyclic antidepressants (such as clomipramine and imipramine) may result in a “serotonin syndrome” with changes in mental status, hypertension, restlessness, myoclonus, hyperreflexia, diaphoresis, shivering and tremor.

Serum levels of dextromethorphan may be increased by the concomitant use of inhibitors of cytochrome P450 2D6, such as the antiarrhythmics quinidine and amiodarone, antidepressants such as fluoxetine and paroxetine, or other drugs which inhibit cytochrome P450 2D6 such as haloperidol and thioridazine.

Concomitant use of dextromethorphan and other CNS depressants (e.g. alcohol, narcotic analgesics and tranquillizers) may increase the CNS depressant effects of these drugs.

The following interactions with chlorpheniramine have been noted:

- CNS depressants (alcohol, sedatives, opioid analgesics, hypnotics) – may cause an increase in sedation effects.
- monoamine oxidase inhibitors (MAOIs) and tricyclic antidepressants (TCAs) – may prolong and intensify the anticholinergic and CNS depressive effects.
- when taken concomitantly with phenytoin may cause a decrease in phenytoin elimination.
Adverse reactions

Side effects of paracetamol are rare and usually mild, although haematological reactions have been reported. Skin rashes and hypersensitivity reactions occur occasionally. Overdosage with paracetamol if left untreated can result in severe, sometimes fatal liver damage and rarely, acute renal tubular necrosis.

Adverse effects of pseudoephedrine include:
- cardiovascular stimulation – elevated blood pressure, tachycardia or arrhythmias
- CNS stimulation – restlessness, insomnia, anxiety, tremors and (rarely) hallucinations
- skin rashes and urinary retention.

Children and the elderly are more likely to experience adverse effects than other age groups.

Side effects with usual doses of dextromethorphan are uncommon but may include mild drowsiness, fatigue, dystonias, dizziness and gastrointestinal disturbances (nausea or vomiting, stomach discomfort, or constipation).

Side effects that may occur with high doses (overdosage) of dextromethorphan include excitation, confusion, psychosis, nervousness, irritability, restlessness, “serotonin syndrome”, severe nausea and vomiting, and respiratory depression.

Central Nervous System (CNS) effects
CNS depressive effects of chlorpheniramine include sedation and impaired performance (impaired driving performance, poor work performance, incoordination, reduced motor skills, and impaired information processing). Performance may be impaired in the absence of sedation and may persist the morning after a night-time dose.

CNS stimulatory effects of chlorpheniramine may include anxiety, hallucinations, appetite stimulation, muscle dyskinesias and activation of epileptogenic foci.

High doses of chlorpheniramine may cause nervousness, tremor, insomnia, agitation, and irritability.

Anticholinergic effects
Side effects of chlorpheniramine associated with cholinergic blockage include dryness of the eyes, mouth and nose, blurred vision, urinary hesitancy and retention, constipation and tachycardia.

Dosage

The recommended dosage of Codral* Original Cold & Flu + Cough Day & Night capsules for adults and children over 12 years is:
- Day dosage – take one or two green capsules in the morning, at midday and in the afternoon as required.
• Night dosage – take one or two red capsules at bedtime as required. Each dose should be taken at least 4 to 6 hours apart. Do not exceed four doses in 24 hours.

Codral* Original Cold & Flu + Cough Day & Night is not recommended for children under 12 years of age.

Use in adults
Paracetamol should not be taken for more than a few days at a time except on medical advice.

Use in children
Paracetamol should not be taken for more than 48 hours except on medical advice.

Overdosage
If an overdose is taken or suspected, immediately contact the Poisons Information Centre (in Australia, call 13 11 26; in New Zealand call 0800 764 766) for advice, or go to a hospital straight away even if you feel well because of the risk of delayed, serious liver damage.

Presentation
Codral* Original Cold & Flu + Cough Day & Night day capsules are blue green/white opaque hard gelatin with ‘Day’ printed in black.

Codral* Original Cold & Flu + Cough Day & Night night capsules are reddish orange/white opaque hard gelatin with ‘Night’ printed in black.

Codral* Original Cold & Flu + Cough Day & Night capsules are available in blister packs of 24 capsules (18 Day capsules, 6 Night capsules).

(S3) Pharmacist Only Medicine

Store below 30°C.

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Name and Address of Sponsor

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